

MANAGING COWS IN A CONFINEMENT SITUATION

Jaymelynn Farney, Ph.D.

Assistant Professor, Animal Sciences and Industry

Chris Reinhardt, Ph.D.

Associate Professor, Animal Sciences and Industry

Glynn Tonsor, Ph.D.

Associate Professor, Agricultural Economics

Jared Petersilie

Agriculture and Natural Resources Agent, Walnut Creek District

Sandy Johnson, Ph.D.

Associate Professor, Animal Sciences and Industry

Whether due to drought or competition for grazing land, cattle producers are becoming inventive with ways to feed and manage their cow herd. This bulletin will address some ways to manage your cow herd by feeding cows in confinement. Confinement refers to moving cows off grass and housing them in a pen setting. Some areas that will be addressed include culling decisions, diets, housing options, and concerns with placing cattle in confinement.

Culling and cow decisions

Since it is not cheap to feed cattle in confinement, it is important to make sure you are only feeding cows that have the greatest chance of returning a profit. The easy culling decisions include selling old, open, onery, bad-uddered, and odd-ball cows from your herd. Odd-ball refers to those that are different colored or calve at a different time than the rest of the herd. For example, if your herd is 85% spring calving you might consider selling those cows that are fall calving.

Dry cows have the lowest energy and protein requirements, especially if they are in the first 2 trimesters of gestation. Weaning is often considered before confinement feeding because dry cows require less feed. Early weaning can occur at just about any time, but it is generally easier as calves get older.

Advantages of early weaning include:

- 1) improved cow body condition
- 2) improved calf performance
- 3) improved conception rates
- 4) improved forage availability for the cow (or decreased feed requirement).

Some disadvantages include:

- 1) increased management of calves
- 2) increased cash costs

Weaning very young calves (30 to 90 days of age) will enable cows to rebreed sooner because the negative effects of suckling have been removed and energy should no longer be limiting. To achieve a 365-day calving interval, cows must conceive within 80 days of calving. If breeding will occur in confinement it presents an excellent opportunity to synchronize estrus for use with either AI or natural service. Synchronization will increase the number of calves born early and thereby increase weaning weight the following year. If cows must be transported to a lot during, or within 45 days of the end of the breeding season, the transportation stress could cause some embryonic loss. Nutritional stress associated with a new confinement diet could also contribute to embryo death. Pregnancy diagnosis should occur 30 to 40 days after the end of the breeding season so open cows can be marketed.

Even though reproductive response is improved in cows that have very early weaned calves (30-90 days of age), many producers do not like this option because of the extra concerns that are involved with management of calves. Calves of this age will retain passive immunity from their dams but tend to be more finicky eaters that will sort diet ingredients if not carefully selected. Another option for these calves is to wean and sell at an auction facility, but the producer needs to consider the dramatic loss in saleable calf weight if these early weaned calves are sold immediately upon weaning.

Weaning is generally easier if calves are at least 90 days of age as they are now much better eaters. If managed properly, early weaned calves can perform better than calves that are left nursing their dam. Cows that are weaned earlier easily regain body condition and/or maintain body condition, and require less feed to do so. The improved body condition often is associated with earlier rebreeding the following year.

Diets

Limit-feeding cows

1. Consumption and Nutrient content

Limit-fed cattle are provided a limited amount of a nutrient-dense feed instead of being offered ad libitum access to feed. Energy is a key component to making limit-feeding successful. Specifically, the cow's energy requirements must be met while the cow is consuming less than what her voluntary intake would be when provided unlimited access to medium quality hay. Limit-feeding can be successful with cows or calves. Advantages to limit-feeding cows include:

1. Reduction in feed offered
2. Increase in feed efficiency

Protein is important in limit-fed cow diets and can be an expensive component. However, in high energy limit-fed diets, urea, a relatively inexpensive protein source can be effectively used. Urea is a source of degradable intake protein, which may be needed in diets high in by-products feeds. It is important to note though, all feeds need to be evaluated on an individual basis to determine concentrations of degradable and undegradable proteins. Supplement protein appropriately to meet cow requirements. Some by-product feeds have quite a bit of by-pass (undegradable intake) protein, so you might need to include degradable intake protein to ensure proper ruminal utilization of the energy ingredients. Normally, for cows that are on pasture using urea as a protein source is not recommended because there is not enough energy readily available to effectively use the protein. However, when feeding a high-energy diet, this is not a concern, if the urea content is included at appropriate levels and mixed properly.

2. Important Considerations

Typically dry matter intake of high energy diets for cows are restricted to 1.5 to 2% of body weight, yet must meet the nutritional requirements of the cow. Since restricting intake is the main concept of limit-feeding, it is extremely important to regularly test nutrient content of ingredients throughout the feeding period so that all nutritional requirements are met. There are several important dietary considerations a producer must be aware of when limit-feeding cows:

1. Understanding negatives of feeding high concentrate diets (metabolic disorders)
2. Mineral supplementation
3. Roughage requirements
4. Adaptation to the diet

Metabolic Disorders

Energy requirements in limit-fed diets can be met with grains, however, other options may minimize digestive and metabolic disorders. Specific disorders that can be caused by high-concentrate diets

include bloat, acidosis, and founder. One way to manage these disorders is to feed high energy products that have the starch removed, such as distiller's grains, corn gluten feed, wheat midds, rice meal, brewer's grains, and soy hulls.

Another option to help prevent acidosis and bloat is to feed an ionophore. Additionally, ionophores will reduce the amount of feed needed for maintenance by 7 to 10%. Currently, monensin is the only ionophore approved for use in reproducing cows and needs to be fed at a rate of 100 to 200 mg per head daily. For producers who do not have the facilities to handle bulk grain and other commodities, a commercial feed made in $\frac{3}{8}$ or $\frac{3}{4}$ inch cubes can work, as long as the feed meets the nutrient requirements of cows. Range cubes which include quality ingredients can be used for limit-feeding of cattle. However, range cubes are typically designed to be fed with hay at 0.5% of animal's body weight, so the nutrient profile may not be appropriate as the sole energy and protein source for cows. Therefore, it is important to take the time and effort to determine the quality and nutrient profile of the range cube prior to feeding and consult with your nutritionist and/or extension agent to determine feeding rate.

Mineral Supplementation

Since the use of by-products and other grains are common in limit-feeding of cows, mineral composition is important to evaluate. Typically grain products are low in calcium while often being high in phosphorus, potassium, and sulfur. In contrast to pasture based diets, which need additional phosphorus, a mineral high in calcium will need to be provided in limit-fed diets. When working with your nutritionist it is important to balance the calcium-to-phosphorus ratio in the range of 1:1 to 6:1. Additionally, since green forages will be minimized in the limit-fed diet, provide a well-balanced vitamin and trace mineral package.

Roughage requirements

To maintain rumen function a minimal amount of roughage must be provided to the cow. Typically a minimum roughage requirement for cows in a limit fed diet is $\frac{1}{2}$ percent of the cow's body weight as hay or silage (on a 90% dry matter basis). Therefore, a 1300 pound cow should receive at least 6.5 pounds of roughage a day. Oklahoma State University researchers recommend feeding between 0.25 to 0.5% of animal body weight of long-stemmed hay. A limitation of limit-feeding cows is that cows that are limit-fed might have reduced forage intake when cattle return to pasture. This is something to keep in mind when cows are returned to "normal" management systems.

Diet Adaptation

To further minimize digestive upsets, cows should be slowly adapted to high grain diets from a predominantly forage diet over a period of about 14 days. Also, it is critical to feed consistently at the same time daily. It is recommended to feed several times during the day, but a once a day feeding can work if there is adequate bunk space allowing all cows to the feed at time of delivery. Cows need to be observed daily for signs of digestive upset and other health disorders. Body condition scoring cows while the cows are at the bunk can be used to help adjust diets to maintain proper body condition based on stage of production.

Pen considerations

Limit-feeding confinement

Pens used to limit feed dry cows can be designed to meet a variety of different stages of production, weather conditions, and type of flooring. It has been reported that the range for pen space requirements are between 125 to 700 square feet per cow. For example, if you have smaller cows (1000 -1200 pounds) housed in a well-drained, hard-packed feedlot pen that is typically dry, then you might

determine cows need a minimum of 125 square feet per animal in dry conditions and 250 square feet per animal during wet conditions. If keeping cows and calves together you want more area in the pen and you might start with 400 square feet a pair in lots that are dry and increase that area as calves grow. Regardless of feeder/bunk type, each cow needs between 24 to 30 inches of bunk space. If cattle are horned they will need even more space.

The fences should be sturdy and withstand a mature cow rubbing and reaching under the fence if grass is close to the pen. Water is of tremendous concern for cows, regardless of housing situation, because it is the number one nutrient for cattle. Cows will consume 15 to 20 gallons per cow per day so the water source needs to be able to continually supply the required water to match whole pen consumption. Water consumption typically peaks during early afternoon during the summer months. Supplying the proper quantity and quality of water is essential. A detailed estimate of daily water intake for cattle is described in Table 1.

Availability of shade will help minimize heat stress, and recommendations are that you provide 20-25 ft²/head. Often times pens are already designed and you want to utilize existing structures, but if there isn't adequate bunk space, add portable bunks. This is illustrated in Figure 1.

Table 1. Estimated Daily Water Intake of cattle¹

Daily High Temp (F°)	Cows Nursing Calves ²	Dry and Bred Cows	Bulls	Growing and Finishing Cattle			
				400 lb	600 lb	800 lb	1000 lb
35	11	6	7	4	5	6	8
50	13	7	9	5	6	7	9
65	16	8	11	6	7	9	11
80	18	11	13	7	9	10	14
95	20	15	20	11	15	17	19

¹Table published originally by S. Gadberry (Univ. AR), adapted from a table prepared by P.Q. Guyer (Univ. NE).
²First 4 months of lactation.

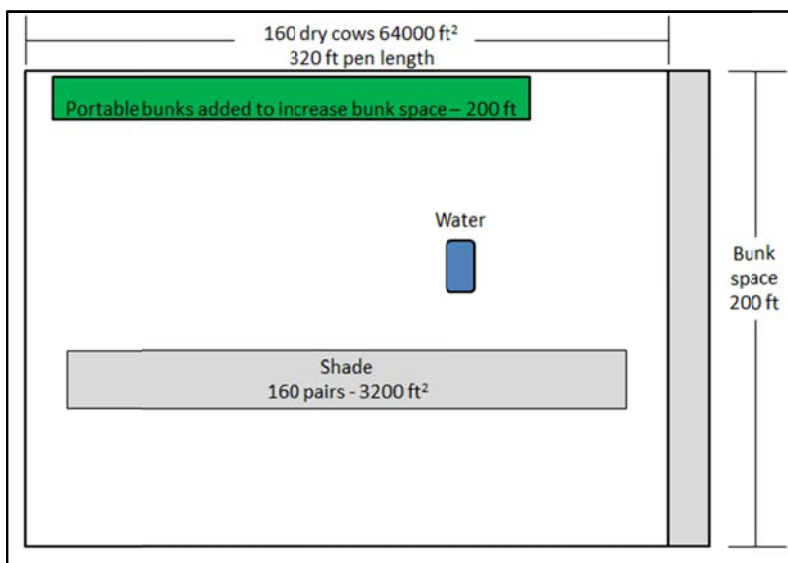


Figure 1: Confinement pen design.

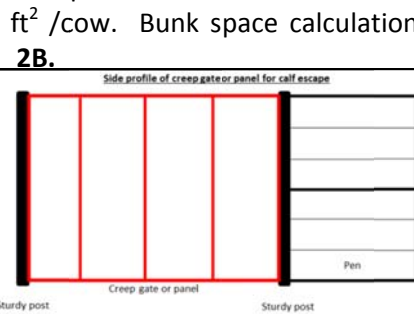
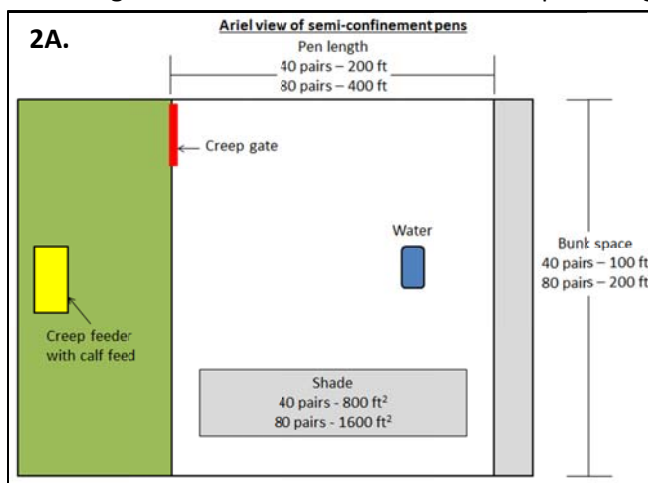
This figure illustrates how a producer can use an existing confinement pen to house a large number of cows, even without adequate “permanent bunk space”. If more bunk space is needed then portable bunks can be added and if they are temporarily attached to the fence-line then they will stay in place. In confinement pens it would be beneficial to have shade provided. By placing the shade in the middle of the pen, it allows for a continuous shade throughout the day. Pen space calculations were based on 400 ft²/cow.

Semi-confinement

Pens used for semi-confinement feeding need a minimum of 500 square feet per animal. Once again bunk space needs to be between 24 to 30 inches. The fence next to the pasture/paddock needs to be very sturdy because the cows will be tempted to escape to pasture. The creep gate or panel set up needs to allow calves to pass freely in and out of the pen but not allow even the smallest cows to escape. It is also a good idea to have a creep feeder for your calves, out in the pasture. The creep feeder is a great “bunk” for calves because it was designed to be the correct height for calves. Water access and other concerns are the same for semi-confinement as that mentioned in limit-feeding. It is also very important that the calves can get to water. Calves need to have water offered to them starting at 3 to 5 days of age. This might require a specific calf waterer in the pasture or make sure calves can get to ponds. Figure 2 is an example of a pen design for semi-confinement.

Figure 2: Semi-confinement pen design.

These figures illustrate a semi-confinement pen design with pen dimensions for 40 or 80 pairs using 500



ft² /cow. Bunk space calculations are for cows only, since a creep feeder is offered for calves. The pasture is the prime location to place the creep feeder. Creep gates or the panel that allow calves to escape into the pasture needs to be very sturdy. For example, it might be wise to place one end of the panel at the corner post and the other end with re-enforced

pipe to make sure cows cannot push the gate/panel down (Figure 2B).

Sacrificing portion of pasture

A possible option to keep your cows on-farm includes sacrificing a portion of the pasture to allow grazing pressure to be removed from the remainder of the pasture. When sacrificing a portion of the pasture, that area will probably not have any grass come back in the future, unless re-seeded. Examples of different set-ups for sacrificing an acre of ground are illustrated in Figure 3. If there is an existing water source in the area you plan to sacrifice, then water will not have to delivered to cattle, however, this does take up some additional pen space so pen size may need to be increased. Bunk and pen space recommendations that are mentioned under limit feeding are the same as that for sacrificing a pasture. Pairs, dry cows, and weaned calves can all be managed this way. When placing pairs in confinement it is recommended to supply a creep feeder with a ration for calves in the pen (total confinement) or in the pasture (semi-confinement). This provides calves their “bunk” space.

Figure 3: Options for sacrificing an acre of pasture for confinement opportunities.

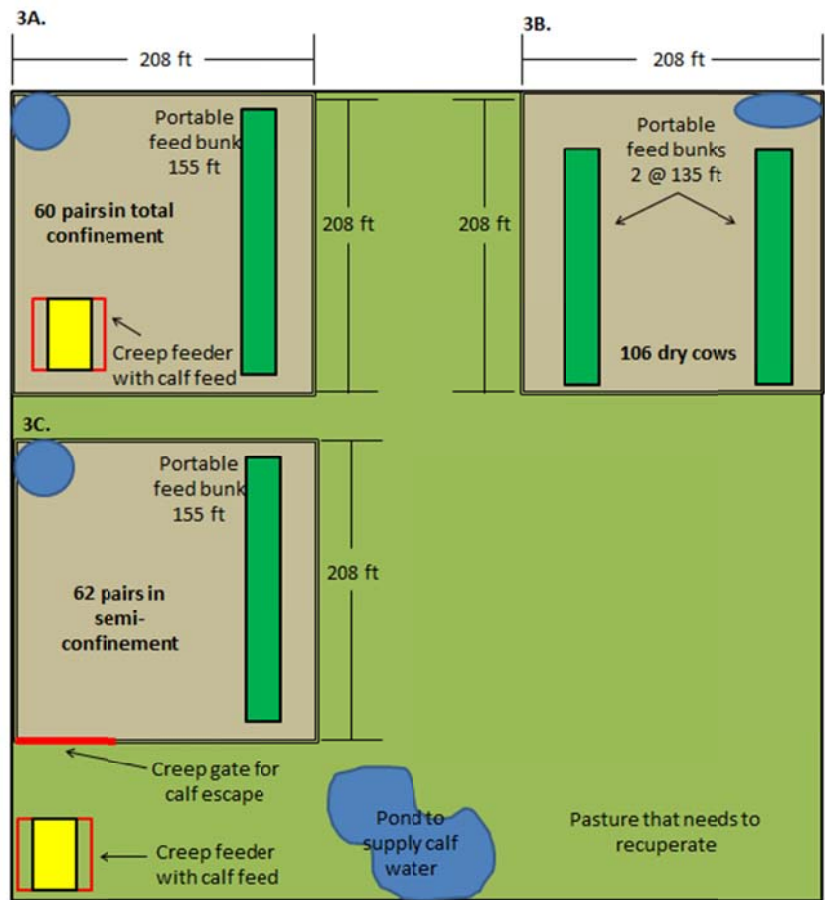


Figure A. Based on (700 ft² /cow), 62 pairs can be placed on one acre; however, because of bunks, creep feeder, and water trough taking up loafing space, 60 pairs is more realistic. Since this is a portion of pasture, bunks will have to be brought in, along with a water source, if you do not build the pen with the water source in it. Figure B. Once again, based on bunks and waterers, it might be recommended to place 106 dry cows on one acre (400 ft² /cow). Figure C. Since the creep feeder is placed outside the pen in the pasture, 62 pairs can be placed in a semi-confinement pen (700 ft² /cow). Since the calves will be the only animals on the pasture, it is ok to allow them to escape into your pasture. This will also allow the calves to access shade trees and ponds.

Cattle concerns in confinement

Regardless of feeding system, it is important that cattle be sorted into uniform groups by weight, size, age, and/or body condition. Age becomes very important in limit-feeding cows because the younger cows are typically less aggressive than older cows about eating at the bunk. Sorting by body condition score allows different diets to be offered based on the objectives of increasing, decreasing, or maintaining current body condition. This will increase efficiency of the operation.

When observing limit-fed cattle they may appear gaunt and behave as though they are hungry and as such, producers **must resist the temptation** to feed more than the pre-determined amounts. Within a couple of weeks, the cows or calves should be adapted to the reduction in dry matter intake so some of the physical responses such as vocalization and pacing should decrease. However, the cows will still be gaunt in appearance and some cows might lose weight due to rumen fill (especially if you do not account for shrink in the first weighing). Some people have observed that during the first couple of weeks after cows were placed on a limit-fed diet, they act hungry enough that they will eat bark off trees and the paint off of fences.

Feed bunk management is easier with limit-feeding because all the feed should be consumed daily so there will not be any need to clean bunks. An interesting side-benefit of limit-feeding is that due to less feed consumed and improved feed efficiency there is less manure produced, reducing handling costs of feed and manure. With a lower feed intake, there is less heat produced which can help minimize heat stress during the summer.

Disadvantages and things to be concerned about with limit-feeding cows include weather fluctuations, machine malfunctions, and thin-cows. Since there is less heat produced by limit-feeding,

during the winter, it might be important to increase feed offered by 10% to provide enough heat for cows. Another concern is that if the feeding schedule gets altered by things like mechanical failure, failure of feed ingredients to be delivered on time, and natural disasters, then the producer will need to start the step-up process again to get cattle back on their limit-feeding program. If a producer does not have a good history of timely feeding, limit feeding might not be the best management option. Thin cows might not be the best cows to place in a limit-fed system, unless you are able to group all thin cows with more than the bunk space listed above. This will reduce competition for feed.

Summary

Limit feeding cows in confinement may:

- Provide a means of retaining cows when pasture resources are depleted
- Increase efficiency of feed use
- Should reduce costs associated with production

Consult with your veterinarian to develop commingling vaccination programs for cows and to discuss potential health concerns of early-weaned calves. For more help contact your local extension agent or area livestock specialist.