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Management Considerations for Beef Cows in Confinement

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If forage is limited or too expensive, feeding beef cows in confinement can be a management strategy to decrease a producer's dependence on pasture. Many factors must be considered, but feeding in confinement may be an alternative to partial or total herd liquidation.

The available forage supply for maintaining beef cow herds continues to decrease. A variety of factors can cause a decrease, including high commodity prices resulting in conversion of non-cropland to cropland; urbanization; and periodic natural disasters such as drought, fire, and insect damage. When forage supplies cannot be sourced at an affordable price, cattle producers can either sell their cattle or feed them in confinement.

Feeding beef cows in confinement is not a new concept. However, one management strategy is to limit feed cows an energy-dense, protein-adequate diet that is less than 2 percent of body weight on a dry matter (DM) basis. The intent is to keep them in the production cycle, rather than finishing them for harvest. This can reduce a producer's dependence on pasture. It also can enable a producer to add a beef cow enterprise to the business or expand an already existing beef cow enterprise.

Keeping cows in confinement 12 months out of the year may not be an economical management strategy. However, partial confinement may be a viable option when pastures need deferment or forage is not available. Producers who confine cows will need to plan a feeding strategy that includes pen design, consideration of the kinds and amounts of feed, delivery method, water supply, calf management, vaccination protocols, and economic factors.

Crop residues and poor quality hays are likely the most economical in both drought and non-drought conditions. Feeds high in energy like grain or sugar byproducts, corn, and silages will need to be included in these rations, depending on which are the most economical and regionally available. Data suggest that

the most economical feeding management strategy for beef cows in confinement is rations that are limit fed.

Nutrient Requirements of the Cow

When producers decide to manage and feed cows in confinement, four concepts related to nutrient needs are key:

- Understand the cow's nutrient requirements, which vary with age, weight, body condition score, stage of production, and environmental conditions.
- Two- and three-year-old beef females have nutrient requirements for growth as well as the stages of gestation and lactation. They should be fed separately from mature cows, especially when feeding a limit-fed ration. This allows young cows to consume the feed needed to meet their requirements.
- The cow's nutrient needs increase rapidly during late gestation and peak at about eight weeks of lactation. To meet the nutrient needs, either increase the energy density of the diet or increase the pounds of dry matter fed during these stages of production.
- If the cow and her calf are managed together, be sure to account for the calf also eating feed out of the bunk.

The calf will eat up to 1.5 percent of its weight on dry matter daily while still nursing its dam. If the calf's ration out of the bunk is not included, the dam will be underfed. These details will be discussed in greater depth in a following section.

Nutrient Content of the Feedstuffs

An important consideration is the nutrient content of the commodities used in rations fed to cows in confinement. Producers are encouraged to send samples of forages that will be used in designing such rations to a commercial laboratory for testing. The total digestible nutrients (TDN) value listed on commercial laboratory results is not from an analysis but is actually calculated from acid detergent fiber (ADF). In the case of forages, this is fairly similar to the digestibility and is an acceptable measure of forage energy.

For some feeds, especially byproduct feeds like distillers grains, a feed analysis is not the best method to determine nutrient content. This is because of the oil (fat) content and the interaction of byproducts in residue-based diets. The University of Nebraska recommends using TDN values for byproducts based on animal performance in feeding trials *(Table I)*. Overestimating energy values for a commodity can result in poorer than expected cattle performance, while underestimating the energy value can cause overfeeding, resulting in increased expense.

Table I. Total Digestible Nutrients of common byproducts and commodities in forage-based diets determined from feeding trials.

Ingredient	*TDN (% dry matter)*
Corn distillers grains, wet, dry, modified	108
Corn condensed solubles	108
Sugarbeet pulp	90
Soyhulls	70
Synergy	105
Corn gluten feed	100
Midds	75
Corn	83
Wheat straw/cornstalks	43
Meadow Hay*	57

*This is an average value for a reference point; producers should test all hay for actual quality before feeding.

Feed Intake of the Nursing Calf

Nursing calves can be seen nibbling at forage within the first three weeks of life. By the time they are 3 months old, research indicates they are eating about 1.5 percent of body weight (BW) in forage. A 300 lb calf eats 4.5 lb of feed DM in addition to nursing the cow. If cows are fed in a dry lot and calves are not weaned, supply additional feed for the calves. Research at the University of Nebraska indicates early weaning does not save much feed energy but may be a good management practice in confinement feeding.

While not resulting in an advantage in feed energy savings, early weaning can be advantageous in other ways. Early weaning allows calves to be fed separately from the cows. This provides the flexibility of feeding the calves a growing or a finishing diet, or even allowing them to graze forages, if available. The non-lactating cows in confinement can then be placed on a lower energy diet.

Management Considerations for Young Calves in Confinement

A water source that calves can access while in confinement is important. A common misconception is that calves nursing cows do not need to drink very much water. Calves do need water even though they are nursing their dams. Young calves need to be able to reach the water tank and have access to sufficient water.

In University of Nebraska confinement feeding trials, calves just a few days old are drinking water from a tank or water source. Tanks need to be banked high enough that calves can reach the water, and water flow needs to be unrestricted enough that the tank can refill quickly after cows drink. The tank also needs to be big enough so that on extremely hot days calves can access the water without cows pushing them away.

Lactating cows may drink 20 gallons of water a day in the summer (See NebGuide G2060, *Water Requirements for Beef Cattle*). The minimum recommended space for 1000 lb feedlot cattle at a tank is 1.2 inches. If 1.5 inches of space is allowed per animal, 22 inches of drinking space would allow 15 feedlot steers to have 16 minutes of drinking time over a four-hour period. A 1200 lb cow and her calf might need 2-2.5 inches of drinking space to get this same access time in four hours. (See Facilities and Environment: Feedlot Water System, *http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/beef11759*). It may be necessary to place small tubs of water out of reach of the cows but accessible to the calves.

In confinement, calves will begin eating feed alongside their dams at an early age. Feed for the calves can be supplied through creep feeders or under an electric fence to allow them access. Calves less than 90 days old have low feed consumption (0.37 percent BW). As they get older (200 to 300 days), they will eat about 1.5 percent of their body weight DM. Eating feed at this age initiates rumen function in young calves. The calves begin eating at the bunk with cows at an early age and need to be able to access the feed bunk as well.

Defining Early Weaning

Early weaning can be defined as anything less than the traditional weaning age of 180-210 days. Determining the appropriate age for early weaning depends on what producers want to accomplish with early weaning. Weaning at 45 days of age is generally done when cows are in poor condition

Table II. Example diets of byproducts and residues for gestating, lactating, and lactating cows nursing 60-day-old calves.

Diet (DM ratio) Byproduct:roughage	*Ingredients*	*Late Gestation Cow*	*Lactating Cow*	*Cow with 60-day-old calf*
		Dry matter intake, lb		
57:43	Distillers grains:straw	15.0	18.0	20.0
30:70	Distillers grains:straw	19.2	23.0	25.6
40:20:40	Distillers grains:straw:silage	15.4	18.5	20.6
20:35:45	Distillers grains:straw:beet pulp	14.6	17.5	19.4

(BCS < 4; 1-9 scale) as discontinuing lactation can initiate estrous cycles.

As previously mentioned, early weaning may not actually result in feed energy savings, but may be a useful management tool. Weaning calves allows producers to reduce the energy fed to non-lactating cows while providing a higher-quality energy source to the calves. Whether producers choose to use a high-quality grass pasture or a mixed diet in a confined pen, the nutrient density of the diet must replace the nutrients in milk if a similar rate of gain is desired. More information on managing early weaned calves is available in NebGuide G2047, *Management of Early Weaned Calves.*

Reproduction in Confinement

Cows can be successfully bred in confinement consuming a high-energy, limit-fed diet. Confinement of beef cows may simplify the use of estrous synchronization and artificial insemination protocols (*http://beef.unl.edu/web/cattleproduction/breedingcowsinconfinement*). When bulls are confined with cows, allow an additional 2 feet of bunk space for every bull and another 15-18 lb of TDN per bull/day.

Defining Confinement Feeding

Feeding beef cows in confinement does not have to be done in a feedlot. The advantages of the feedlot often include feed trucks with scales and mixers, concrete bunks, good fences, the permits needed to feed cows in confinement, and access to commodities not always readily available to ranchers. However, feeding cows in confinement can be achieved by setting up temporary feed bunks or feeding under an electrified fence on harvested crop ground, pivot corners, a winter feed ground, or even, as a last resort, a sacrifice pasture.

When deciding whether to use a feedlot or a temporary pasture, consider all the costs associated with each system. Extension personnel and resources can help you determine if you need to go through the permit process to feed livestock in confinement. This is determined by the number of days that the cattle will be fed in confinement, the number and weight of cattle being fed, and the distance from natural or man-made water sources.

Remember that cattle limit fed a diet while still on a pasture will continue to consume the forage in the pasture, and overgrazing can result if this option is implemented. Regardless of location, cows need a minimum of 2 ft of bunk or feeding space and calves need 1.5 ft. For more information on leaving cattle in pastures and feeding byproducts and residues to replace forage, see NebGuide G2099, *Crop Residues or Low Quality Hay Combined with Byproducts as a Forage Substitute*.

Limit Fed Diet Options for Confined Cows or Pairs

Limit feeding cows is defined as meeting all the cows' nutrient needs, but not feeding cows all they can eat. Cows will adjust to this management practice over a week to 10-day period. When limit feeding in confinement, ingredients must be measured accurately and delivered about the same time each day. Deliver the ration uniformly using all the bunk space.

Numerous commodities are acceptable in cow diets and their inclusion depends on nutrient content, availability, and price. In Nebraska, a large diversity in commodities is available, particularly from the eastern to the western ends of the state. As a result, many diets have been formulated. Most diets include ingredients unique to an area, while other ingredients are available in limited quantities in some areas and cannot be included at high levels.

Purchase price, freight costs, and shrink impact the commodity used and the inclusion rate. The following examples of diets were formulated by UNL extension specialists for research trials or Nebraska producers *(Table II)*. These diets have been designed to maintain body condition on cows and can be adapted for other regions with the help of nutritionists or extension personnel. Handling characteristics also should be considered when determining ingredients to use.

Research indicates that a diet containing 80 percent ground cornstalks and 20 percent wet distillers grains will result in some sorting. Ground wheat straw or low-quality hay may not result in the same degree of sorting. Corn wet distillers grains often results in less sorting than dry distillers. Many producers do not have access to the wet product. Mixing some water with the diet can reduce sorting. Including silage or beet pulp can add moisture to the ration and reduce sorting. Using an ionophore approved for cows in a dry lot should be considered as it will improve efficiency. When distillers grains are included in the ration, limestone should be added. Consider maintaining a Ca:P ratio of at least of 1.5:1.

Table III. Commodity cost on a unit of TDN basis.

Commodity ($/as is ton)[a]	*Commodity*[b]	*DM content (%)*	*Commodity ($/DM ton)*	*TDN (%)*	*Commodity ($/ton TDN)*	*Commodity ($/lb TDN)*
100	WDGS[c]	35	286	108	265	.13
110	Wheat Straw	88	125	43	291	.15
160	Meadow Hay	88	182	57	319	.16

[a]100/.35=286, 286/1.08=265, 265/2000=.13
[b]Includes grinding and delivery.
[c]Wet distillers grains + solubles.

Table IV. Diet cost comparisons to supply 11 lb TDN/d to gestating cows.

Commodity	*DM ratio*	*Amount fed (lb DM)*	*Total lb fed (DM basis)*	*Total lb fed (As is basis)*	*Diet Cost ($/d)*
WDGS:straw	57:43	8.6:6.5	15.1	32.0	1.64
WDGS:straw	30:70	5.8:13.4	19.2	31.8	1.67
Meadow Hay	100	19.2	19.2	21.8	1.74

Calculating Cost on a TDN Basis

When determining the most cost-effective way to feed cows in confinement, several factors need to be considered. In addition to availability, costs associated with handling freight, and delivery to the bunk, and amounts needed, must all factor into the decision of purchasing and using a commodity. To compare commodities, it is often helpful to express all the commodities on a 100 percent dry matter basis and then on a nutrient basis *(Table III)*. Many producers compare protein supplements using this method, which can be done to compare energy feeds.

Because high-energy diets allow producers to limit feed, it is helpful for producers to determine the cost of a limit-fed diet compared to an ad libitum diet *(Table IV)*. A feed cost calculator is available at *http://westcentral.unl.edu/agecon3*, and a University of Nebraska–Lincoln app for mobile devices is available at the iStore and in Google Play. However, the TDN values used by this calculator are book values and need to be adjusted to those found in *Table I.*

Conclusion

Drylotting beef cows can be a viable alternative to partial or total herd liquidation when forage resources are in short supply or expensive. Producers choosing to confine and feed cows should consider limit feeding cows or pairs. Consider the nutrient needs of the cow, changes in nutrient requirements as the production phase changes, the nutrient content of available feeds, the availability and associated costs of feeds, as well as the increasing feed demands of the growing calf.

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