

Weaning Beef Calves

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Fenceline weaning on pasture utilizing temporary electric fence. Photo: Jeff Lehmkuhler

Weaning is the process of separating suckling offspring from their dams. Weaning is a management procedure applied by the herd manager. Cattle are herd animals, and their gregarious nature can lead to stress as a result of this separation. Managing the weaning process can aid in reducing stress for the animals and livestock managers.

Stress

Stress may be generally categorized as physical, environmental, nutritional, and social. **Physical stress** associated with weaning would include restraining the calves for vaccinating, castrating, dehorning, and other physical alterations. To minimize physical stress at weaning, castration and dehorning should be performed at a young age and prior to weaning. Vaccination prior to weaning will also improve calf immunity at weaning.

Environmental stress can be associated with introducing calves to new surroundings such as dry lot pens or new pastures. During weaning, stress can be minimized by moving the cows to a different location and leaving calves in the current, familiar pasture. Leaving calves

in the pasture will require a fence that will prevent calves from jumping over or getting through gaps in the fence. Be sure to walk the entire fence to be certain no gaps exist that would allow calves to escape.

Weather or climatic conditions can also be a source of environmental stress. Weaning should be performed ideally during a period when no rain is in the forecast for the next three to five days. Also, avoid weaning during periods of extreme temperatures. Calves will be more active and walking for longer periods of time than normal during weaning, which can elevate body temperature. High ambient temperatures during weaning could increase the risk to heat stress. Shade should be provided in weaning areas to reduce heat stress when weaning in summer months. Excessive pacing can also increase dust if pens are dry. Daily soaking of dirt lots to reduce dust and cool dirt surfaces may be needed. Avoid weaning during periods when the difference between daytime high and night time lows varies more than 20 degrees. Research has shown that periods of large drops in temperature during fall combined with heavy fog and humidity can increase risk of respiratory disease.

Nutritional stress will occur immediately upon separation from the dam. Milk is a source of high quality protein, energy, and other nutrients for the calf. Milk production peaks two months after calving and decreases to weaning. As the calf approaches six to eight months of age, milk provides only a fraction of the nutrients needed for growth. Forages or other feedstuffs provide a greater proportion of nutrients near weaning. Thus, younger calves will have greater nutritional stress at weaning than older ones. Nutritional stress also is an outcome of reduced forage or feed intake for the first 48 to 72 hours post-weaning. Calves spend more time pacing and bawling than eating during this period, reducing nutrient intake.

As mentioned, cattle are herd animals, and their gregarious nature can lead to **social stress** when separated. The maternal bond is expected to wane over time. The younger the calves are at weaning, the greater the stress of separation is likely to be. This social stress can be even greater when combined with separation from herd mates. Weaning older calves first and young calves at a later date can be done if the manager chooses to wean twice. Weaning methods discussed below can also aid in reducing social stress.

Young calves can be exposed to multiple stressors that can negatively impact the immune system. For example, calves removed from their dams and transported immediately to market facilities would be exposed to stress from all of the categories mentioned above. The social stress imposed at the market facility would include being separated from herd mates into sale lots and then being commingled with calves from different herds after the sale.

The livestock manager can reduce the stress at weaning with planning and management. Taking a Hazardous Analysis Critical Control Point (HACCP) approach to weaning focuses on identifying sources of potential stress and managing in a way that minimizes those stresses. Understanding these stress areas and planning for them will also reduce potential burdens on the manager that can be incurred during weaning time.

Timing

Calves are often weaned at 6 to 8 months of age. This is slightly younger than research would suggest for natural weaning, which occurs on average at 9 to 11 months of age. The typical calving season is nearly 100 days in length. Weaning a calf crop in most herds is conducted on a single day for all calves. This results in calves that may be near 250 days of age for the oldest and 150 days for the youngest. The wider the range in age at weaning, the greater the management challenges.

Weaning at a young age is an option when conditions warrant. Calves may be weaned as early as 60 days of age, which is near the time the rumen is fully developed. Special consideration is needed for these early-weaned calves. The nutritional program must provide sufficient energy and protein to allow for adequate calf growth, which often requires concentrate or grain supplementation. Early weaning often occurs during periods of limited forage availability, such as drought conditions. Weaning greatly reduces nutrient needs for the cow and limits body condition loss.

Table 1. Grain mixtures that can be offered the first five to seven days post-weaning

Ingredient	A	B	C	D
Corn*	35	40	33.3	43
Oats	15	--	--	--
Soybean hulls	25	20	33.3	25
Corn gluten feed	25	--	33.3	--
Cottonseed hulls	--	15	--	20
Soybean meal	--	--	--	12
Dried Distillers Grains	--	25	--	--
Est. CP, % DMB	14	15	15	14

*Corn would be coarsely cracked when mixing with distillers grains or soybean meal (examples B & D).

Feed Considerations

For many, weaning in dry lot pens or pens near barns are preferred. The land area needed is less than if calves are weaned on pasture. Fifty to sixty square feet are recommended for weaning in pens within a barn or on concrete. Open lots should provide 100 to 200 square feet per calf and maybe greater depending on the amount of precipitation received. Weaning in dry lots will require harvested forages (hay, silage) and possibly grain supplements.

During the weaning period, the primary nutrition goal is to simply get the calves to eat. Dry, leafy grass or grass/legume mix hay cut at a vegetative stage of maturity is recommended. The hay should not have mold or a musty odor that would discourage intake. Kentucky 31 tall fescue should be avoided at weaning, if possible. If Kentucky 31 tall fescue must be fed, offer second or third cuttings with minimal seed heads. Avoid bales that are extremely dense or tightly wrapped if feeding round bales. Calves should be able to easily consume hay from the bale.

A grain supplement may be offered to increase nutrient intake, especially protein and energy during this weaning period. The reduced intake during the first 24 to 72 hours after weaning will require a diet that is more nutrient dense. A supplement should contain 16 to 18 percent crude protein. Avoid the use of non-protein nitrogen (NPN) or urea in weaning supplements.

The energy content of supplements offered during weaning can vary. The energy level should provide enough energy to sustain body weight during the period of low intakes. However, caution should be exercised regarding the level of starch in the diet to avoid digestive upsets. Cereal grains such as corn, wheat, barley, and others can be utilized. Cereal grains, if processed, should be coarsely ground or rolled. Limiting cereal grains to around 50 percent of the total grain mix will lower the total starch content and limit the risk of acidosis and founder. Inclusion of coproduct feedstuffs containing highly digestible fiber and protein is a common practice today. Soybean hulls, corn gluten feed, distillers grains, rice bran, beet pulp, and similar feedstuffs can be added to provide energy and/or protein while adding little to no starch.

Additional feedstuffs can be utilized to manage the risk of bloat and acidosis. Cottonseed hulls are commonly used as a source of fiber. Cottonseed hulls have been shown to stimulate intake of newly received feedlot calves. Whole oats are another valuable feedstuff for weaning diets as the husk provides fiber and the starch is degraded slower than other grains. Rice and peanut hulls provide nearly no feed value other than to dilute starch density in the diet. These feedstuffs are low in digestibility and the fiber particle size is too small to provide much stimulatory effect for rumination. Example weaning diets are provided in Table 1. These are only examples, and many variations of feed ingredient combinations can be used effectively.

Hand-feeding supplements is encouraged during the weaning period rather than self-feeding. This allows the manager to visually observe the calves daily. Take note to determine which calves are readily coming to the bunk for grain supplement and those not eating from the bunk. Do not increase grain offering until the majority of the calves are consuming grain to avoid the risk of overeating or foundering calves. Daily feeding also provides an opportunity to check for sickness, which allows for more timely treatment of sick calves.

During the weaning period, ensure that calves have access to water. Water should be clean and free of any debris or contamination. Feed and fecal contamination can occur to waterers in weaning pens. Daily check of waterers is recommended. Frost-free waterers should have the balls or discs removed or locked down below the water surface to improve the calves' ability to drink. Open water tanks work well for the first few days, when calves are not accustomed to drinking from waterers.

Calves should be provided a diet balanced for macro- and micro-minerals. Mineral supplements are best provided through the grain mix. If supplement is not fed, then provide access to a quality free-choice mineral product. Loose minerals have been shown to have greater intakes than when offered in block form. Molasses-based mineral tubs may promote intake during the weaning period.

Weaning Method

Abrupt weaning is one of the most common management strategies implemented in the industry. Calves are removed from the dam and transported some distance away. Often calves are transported directly to a local livestock market facility the day of separation. Abrupt weaning and immediate marketing induces a significant degree of stress. Dam separation, transportation, separation from herdmates, and commingling with other calves can be compounding stressors that can weaken a calf's immune system, increasing the risk of respi-

ratory disease and other disorders. This method of weaning is not recommended.

Fenceline weaning is likely the second most common weaning method employed. Cows and calves are allowed visual and nose-to-nose contact in this method. Calves may be separated from dams and placed in dry lot pens with cows having access to a drovers alley allowing cows to be near calves. Pastures can also be utilized where cows are managed in an adjacent pasture to calves. The fence must be able to maintain the separation between calves and cows. Woven wire fences are common as they provide a solid barrier as opposed to barbed or high tensile wire. Electrified fencing can be utilized if livestock are already accustomed to this fencing.

Nose flaps are another means of weaning that eliminates the separation component. A device is attached to the nose of the calves that prevents them from being able to suckle the cow. Calves remain with their dams for a period of time up to five to seven days. Leaving nose flaps on calves for longer is not recommended as research has demonstrated nose irritation. Calves are then separated from their dams and nose flaps removed. Calves are maintained in weaning pens or designated pasture areas separated from the cows. Research has shown altered behavior suggesting reduced social stress impact through reduced vocalization and walking with nose flap use.

Preventive Health Care

The stress of weaning can weaken the calf's immune system. The primary health challenges during the weaning phase include coccidiosis and bovine respiratory disease (BRD) complex. Preventive management should be implemented to enhance immunity around weaning time.

Coccidiosis is caused by a protozoan that is indigenous to the gastrointestinal tract of cattle. During weaning, stress and reduced intake may alter the hindgut's ability to keep beneficial microflora populations at levels to outcompete pathogenic microbes. The imbalance in

the gastrointestinal tract may allow for greater numbers of coccidia. Coccidia organisms attack the intestinal lining of the small and large intestine. Visual diagnosis may include unthrifty appearance, watery diarrhea, and blood and epithelial tissue in the stool. Dry lot pens tend to be a greater risk for infection due to increased concentration of the animals in a smaller area. Prevention of coccidiosis includes providing an ionophore in the feed or mineral in addition to providing more pen space for calves during weaning. Once symptoms of bloody diarrhea appear, treatment will be needed to kill the organism.

Bovine respiratory disease (BRD) complex is the most common disease challenge of newly weaned feeder calves. This disorder is caused by viral and bacterial organisms. Consult with your local veterinarian to develop a preventive health protocol. Prevention includes vaccination against the major viral organisms that contribute to the complex. These include parainfluenza 3, bovine respiratory syncytial virus, bovine viral diarrhea, and infectious bovine rhinotracheitis. Vaccination against the bacterial organisms *Pasteurella multocida*, *Mannheimia hameolytica*, and *Histophilus somni* may also be warranted.

Internal and external parasites can further suppress the immune system of calves. Calves are more susceptible to internal parasites than mature animals. Administering an anthelmintic for internal parasite control is recommended for calves. Research suggests that controlling internal parasites in young calves is one of the top management strategies for increasing weight gain.

Consulting with the local veterinarian to develop a preventive health protocol for calves can have additional benefits if an emergency arises. Veterinarians must have an understanding of the farming operation prior to prescribing medicated feeds requiring a veterinary feed directive and prescription antibiotics. Having a relationship with a local veterinarian is an asset for any livestock operation.

Marketing

Weaning calves on the farm requires additional input costs associated with preventive health care, labor, feed, and death loss. Market research indicates that calves weaned prior to marketing are valued and often receive a greater price than calves of similar quality weaned at the time of marketing. Managers should consider marketing plans that maximize the opportunity to capture the added value of these calves.

Managers should provide documentation on the preventive health care program administered as well as the length of time calves have been weaned to the market facility or potential buyers. Marketing calves at special sales, such as the Certified Preconditioned for Health (CPH) sales in Kentucky, increases the odds of capturing the greatest price.

Summary

Understanding factors that lead to stress and managing to reduce stress will improve the health and performance of calves, as well as reduce stress on the manager. Weaning prior to marketing will reduce the stress imposed on calves and improve immunity. Calves that return to eating quickly after weaning will gain more weight and be heavier at marketing. Market pre-weaned calves in a manner that will capture the added value and improve the economic viability of the beef operation.