Managing for a Successful Calving Season

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Summary

Short, defined calving seasons are easier to manage, but they hinge upon a defined breeding season. Heifers and cows must be fed to the correct body condition score (BCS) and participate in a sound vaccination program in order to have successful breeding and calving seasons. When we define success as having a calf survive its calving season and thrive to weaning, then particular attention must be paid to the calving environment and to neonatal health practices. Equipment and supplies must be prepared before the first calf is born.

Achieve a defined and narrow calving season

One fundamental management practice that aids success is a defined and narrow calving season. It's necessary to have a defined breeding season to achieve this; therefore, bulls cannot live with the breeding herd year round. More than half (54.5%) of the operations in a Penn State University study did not have a defined breeding season, while 34% claimed to have a defined breeding season. Of the operations claiming to have a defined breeding season, 61% had a breeding season longer than 84 days.

Wide breeding seasons translate into wide calving seasons, making management tasks difficult to administer to groups of animals. The authors of the Penn State study identified the calving season rule of thumb as 90 days, "to insure that all the cows calve within a year, but the length should be based on herd and management needs from manager time and marketing. The optimum calving season would have 60% of the cows calving in the first 30 days of the calving season. Conversion to a shorter calving season will highlight two things in the herd. First, less fertile cows can be identified, and these freeloaders can be eliminated. Open cows during a breeding season cost money from lost weaning weight. Secondly, management problems can be identified that are preventing effective reproductive efficiency. This problem can usually be traced to nutrition."

Optimum bull power is also needed to achieve the maximum number of cows pregnant to their first service.

Body condition and nutritional needs

A successful calving season begins with the cow's or heifer's BCS and nutrition throughout their gestations, but especially so during the last trimester.

Heifers must be fed to reach 85% of their mature weight with a BCS of 5.5 to 6.5 at 24 months of age when they deliver their first calf. In order to make this weight, they need to be bred at 65% of their mature weight. Feed heifers so they are the right size by 12 months of age, and then breed at the first heat after they turn a year old. It may take a few cycles before they settle. The goal is for heifers to be pregnant by 14 months of age.

Breed heifers one month before breeding mature cows, so they calve first. As compared to mature cows, it takes heifers longer to return to heat following calving because they are still growing. Calving a month earlier helps heifers to be ready to join the breeding group at the same time as the mature cows.

The majority of fetal growth occurs during the last trimester, especially the last 45 days. Cows should enter the calving season with BCS of 5. However, cows calving in January and February and young cows (2 - 3 yr. olds) should have BCS closer to 5.5 - 6. Pay attention to protein supplements and trace minerals.

Colostrum quality suffers without adequate copper, manganese, zinc, and selenium.

Industry has increased weaning weights and growth rates, and therefore increased frame size, which has led to increasing calf birth weight (BW). BW is highly related to dystocia and to length of gestation. BW increases 0.3 - 1 lb. per day near the end of gestation and dystocia increases 0.7 - 2% per lb. of BW. The breed of sire and of dam also impacts BW

Do not underfeed in order to decrease calving difficulty. Thin cattle have dystocia more so than fat ones. Research at US Meat Animal Research Center in Clay Center, Nebraska demonstrates that cows fed low energy diets had smaller BW calves but also had the highest degree of dystocia. Underfeeding cows prior to calving also delays return to estrus.

Over-conditioned cows and heifers also have problems. Besides the obvious poor economic return regarding feed costs, fat in the pelvic canal may cause dystocia, and liver metabolism of fat stores often causes cattle to be appetite- and immune-suppressed after calving.

Vaccination programs

Work with YOUR veterinarian and your advisors to determine what vaccinations are needed to protect your herd. The goals of a vaccination program are to

- Protect the calf against disease.
- Provide protection for the calf's entry into the adult herd, either as a herd replacement or for placement onto a feedlot.
- Increase or maintain the level of overall herd immunity.

Vaccines need time to work; the level of immunity they provide peaks and wanes over time. You want higher levels of immunity present during the times of the animal's life when it is most needed.

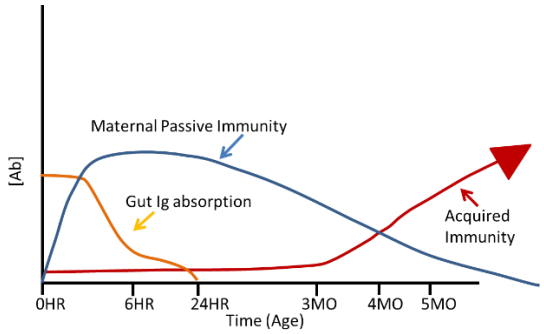
Have facilities in place so you can conveniently handle your herd. There are several opportunities to vaccinate both dams and calves:

- Pre-breeding - to boost protection against reproductive diseases.
- Pregnancy check - at 45-60 days post-breeding so you may make management decisions for the open animals, either to rebreed or sell, and to have accurate estimations of due dates; boost pre-breeding vaccinations at this time.
- Pre-calving - to boost passive transfer of immunity into colostrum.
- Pre-weaning - to boost calf immunity over the stress of weaning, and there may be booster shots for dams at this time.

Don't forget about the bull. Boost his immunity to reproductive, respiratory and *Clostridia* diseases.

Vaccinating late gestation females and newborns is done to prevent diarrhea and respiratory problems that calves have early in life. Scours (diarrhea) is the biggest enemy of newborns less than two weeks old, with respiratory problems occurring in three-week and older calves.

There is an age dependent correlation to calves' susceptibility to respiratory disease. Three- to five-month-old calves are susceptible to respiratory disease, especially if their routine is disrupted at this time (for example chute work when artificially inseminating cattle or early weaning of calves).



This susceptibility occurs because maternal antibody [Ab] provided by passive immunity is gone at four months, while the calf's immature immune system is not yet ready to face a respiratory challenge. The calf's acquired immune system is fully functional when the calf is 12 months old.

Intranasal vaccines to may be given to newborns to protect them from early pneumonia. TSV2 or Naselgen may be given to prevent IBR and PI3 viral infections. Protection begins to peak one week after dosing, and lasts for about four weeks. Inforce-3 is an intranasal product given to prevent IBR, PI3 and BRSV, and has proven efficacy against BRSV. BRSV is the most common cause of respiratory illness. The protection from Inforce-3 given at birth lasts seven to nine weeks; when given at 6 - 8 weeks of age, the protection lasts four months.

Rotavirus, Coronavirus and *Escherica coli* bacteria are the three major pathogens associated with early scours in calves. The E. coli K99 strain causes sudden death of calves less than 3 days of age. The viral agents cause diarrhea in calves that are seven to 10 days old. *Clostrida perfringnes* types A, C and D bacteria may cause acute death, intestinal bloat and diarrhea in fast-growing calves (that are eating well) at about one week of age.

The neonatal immune system is capable of responding in limited ways, but not to systemic vaccines (those injected into the calf). Maternal antibodies may block the vaccines injected into neonates, and the immune response to vaccines may take at least two weeks to develop; by then the calf may be dead or better on its own. It is for these reasons that oral vaccines to Rotavirus, Coronavirus, E.coli K99 and *Clostridia perfringnes* are manufactured as antibody concentrates, so very much like colostrum, they are passively transferred across the gut wall during the calf's first day of life.

There is an attenuated vaccine product for Rota- and Corona-viruses that works best by rehydrating it and spraying the mixture into the back of the calf's throat. Delivering it in this manner allows it to replicate in the gut where it is passively absorbed. This rehydrated vaccine must be given before the calf nurses or ingests colostrum, otherwise the colostrum antibody will block its absorption.

Passive transfer of immunity

The bovine placenta does not allow the transfer of immunity from the dam to the calf. Immunity is transferred in colostrum (the milk produced at calving) by a process called passive transfer. Passive transfer is available for the calf's birth day, with the calf's intestinal tract closed to passive transfer by 50% within six hours of birth, and completely closed 24 hours after birth.

Oral stimulation starts the gut closure, and it is a race to see what gets absorbed first: mother's colostrum rich in immunoglobulin (IgG), (and other good things like growth hormone, estradiol, insulin, fat, protein and lactoferrin) versus disease causing pathogens from a dirty or muddy environment.

Failure of passive transfer (FPT) in dairy calves is defined as a blood IgG level of less than 10 mg/mL at 24 to 48 hours after birth. Research suggests that calves should be fed at least 100 g of IgG, and feeding 150 to 200 g is recommended to ensure plenty of IgG is available to the calf. Ingesting colostrum late or not at all, and ingesting poor quality colostrum (low in IgG) are primary causes of FPT in calves.

Beef calves may also have FPT, and the impact of FPT is often overlooked because studies with long-term health and reproduction in older beef females have not been done. This work has been done in dairy and its impact is tremendous! As they are both bovines, we can assume the same holds for beef calves. Indeed, those who raise cattle know the best calves come from the best cows; those with good mothering instincts who encourage their calves to nurse quickly after being born, and who provide excellent quality and quantity of colostrum to their calves.

A University of Nebraska Study found an average of 60% FPT on the ranches where they measured passive transfer in calves; only 10% of the very best managed cow/calf herds had passive transfer. Time to stand and time to nurse is correlated to bull genetics. For every hour not nursing, the calf loses 3-5% of colostrum quantity/quality.

Ingestion of colostrum sets up perinatal programing: what the calf eats for first 24 hours to 60 day of age forever impacts feed efficiency, and pre-weaning nutrition is more indicative of future performance than

genetic selection. If denied, they can't catch up. Relaxin in colostral substrate is responsible for reproductive development of mammals and poor breeders result when relaxin was not provided.

Passive transfer of immunoglobulin is indirectly measured by testing the blood (serum) total protein in the calf.

A refractometer is used to measure serum proteins. The goal is for 80 percent of one to seven day old calves to have serum total protein of 5.5 grams per deciliter (g/dL) or higher. Under that level indicates FPT. Your veterinarian can quickly and inexpensively perform this test. Consider testing serum proteins when your calves are sick or dying at less than 10 days of age.

Vaccines are given to pre-fresh cattle to protect the neonate from scours. The adult mother has a fully functioning immune system capable of creating IgG specific to the vaccines she receives and to the disease causing agents she is exposed to. She passes IgG into colostrum. IgG begins concentrating in udder five weeks pre-calving, and peaks two weeks prior.

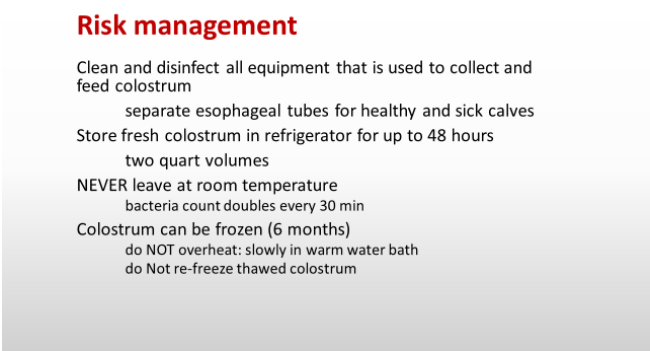
Timing of scour vaccinations to the dam are critical. The first dose needs to be administered nine weeks prior to calving with the booster six weeks prior to calving. Follow label directions for subsequent boosters. After the initial paired dosing, the vaccine ScourGuard4KC is labeled for one yearly booster given six weeks prior to calving when cattle are properly dosed the prior year, and calving occurs yearly.

The calf must nurse several times during the first six hours of its life in order to obtain the IgG, fat, protein, insulin and other factors provided in the colostrum. Be prepared to hand milk the cow, or have a supply of good quality refrigerated or frozen colostrum or colostrum replacer product (containing 100-150 IgG per dose) to feed when nursing quantity or quality is suspect. Milk-based colostrum replacers are preferred over serum-based ones. Mix and feed colostrum replacers exactly as their label indicates.

Colostrum supplements are also available. They are made from dried bovine colostrum or serum and contain 40 to 60 g of IgG per dose (9 to 13% globulin protein). Colostrum supplements can be used to increase the amount of IgG fed to calves when only low or medium quality colostrum is available. However, supplements cannot replace high quality colostrum and do not deliver the higher levels of IgG that colostrum replacers have.

Colostrum replacers were developed because supplements were not particularly effective. Supplement products are less expensive than replacer products. One strategy to reduce the overall cost of using these products is to feed a colostrum replacer for the first feeding and a colostrum supplement for the second feeding.

The calf should be bottle fed or tubed if it cannot, or will not, nurse within six hours of birth. Dairy research indicates that to most reliably deliver high levels of IgG, feed at least a gallon of colostrum to newborns, and two quarts six hours later. The risk of failure of passive transfer is greater if the colostrum is fed in two time periods because the second feeding of colostrum has a much lower rate of absorption than the first.



Colostrum is absorbed best when the calf suckles. When bottle feeding less than three quarts, absorption and IgG transfer can be slightly improved in nipple fed rather than tube fed calves. There is no difference in colostrum absorption between nipple and tube fed calves when more than three quarts are fed. Use separate esophageal tubes for healthy and sick calves.

Successful calving

The calving environment plays a critical role in the calving season's success. For details regarding calving environments, review the accompanying factsheet *When is the Best Time to Calve Beef in Wisconsin?*

Prior to the first calf being born, check calving equipment (chains, straps, calf jacks) to make sure that all are clean and functioning. Clean, disinfect and bed the areas you plan to use and have cleaning agents, disinfectants and bedding on hand throughout the calving season. Stock up on:

- ✓ OB sleeves, lube
- ✓ soap for washing your hands and the vulva
- ✓ towels for drying and stimulating the newborn
- ✓ calf blankets for at-risk calves
- ✓ naval disinfection
- ✓ colostrum replacer and supplements
- ✓ milk replacer
- ✓ newborn vaccines
- ✓ ear tagger and tags

Keep calving heifers separate from mature cows so you can closely monitor them. A heifer should deliver the calf within one hour of the water bag appearing (mature cows will deliver within a half hour).

Check close-up cattle at least three times during a 24-hour period to detect calvings as they begin. You can encourage 80% of calvings to occur between 7 am and 7 pm by feeding close up cattle twice daily at 11:30 am and 9:30 pm.

If you notice the water bag, or feet, but you are not sure how long she has been in labor, note the time and watch for progress. See what they accomplish on their own while giving the cow another 15 minutes and the heifer another 30 minutes. Watch quietly from afar so as not to interrupt their labor.

A normal presentation is either anterior (two front feet and head resting on top of the legs) or posterior (two hind feet, with a tail between). Be prepared to examine her (after the time noted above) when you can't see the presentation or progress is not being made.

A normal newborn should immediately be active, shaking its head, snorting, shivering, taking deep breaths and trying to stand. Weak Calf Syndrome results from prolonged Stage II labor (longer than 30 minutes for cows, 60 minutes for heifers), during which carbon dioxide levels build up in the calf. This results in poor gasping and respiratory efforts, slow heart rates and subsequently low internal body temperatures. Weak calves are slow to stand, and slow to nurse; depression ensues and many of these calves scour and die within the first week of life.

Good mothering helps to stimulate calves. Sometimes you may need to be the mom: vigorously towel dry the calf, tickle its nostril with a firm piece of straw, pour cold water in its ear, and turn it from side to side. Encourage mother to get up and help; immediately after calving, give her a warm bucket of water to drink. Cows do not like to put their head into deep narrow buckets, so you may need to refill a short, shallow bucket several times until she is satisfied. Make the water more interesting to drink by mixing in electrolyte or milk replacer. Salting the calf, or sprinkling sweet feed over it will stimulate mom to lick the calf.

Whenever possible, and especially following assisted calvings, soak the newborn's navel in 7% iodine or other disinfectant recommended by your veterinarian. The navel is attached to the liver, and it will wick pathogens from the environment. Keep the neonatal calf's environment as clean and dry as possible before the navel dries and falls off.

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