

Improve Reproductive Performance in Your Cow Herd Using Calf Removal¹

Gary R. Hansen²

When evaluating which cows in the cow herd are the most productive, it is wise to consider calving date. Cows that consistently calve in the first 21 days of the calving season will typically wean between 250 to 300 more pounds of calf during their lifetime in comparison to late-calving cows. Many factors affect a cow's ability to become pregnant following calving. The most common cause of low fertility in beef cattle herds is inadequate nutrition. Numerous studies have shown that pregnancy rates are highest for herds with satisfactory nutrition programs. Use of body condition scores at critical times during the year will allow cattle producers to assess their nutritional programs. Researchers have shown that cows with low body condition scores (4.0 or under) have a 30 % reduction in pregnancy rates compared to cows with optimum body condition scores (5.0 to 7.0). Cow age is another factor that affects pregnancy rates. Younger cows (2- to 4-year-olds) generally resume estrous activity more slowly than mature cows, making it difficult for these cows to calve in the first 21 days of the calving season. Estrous activity is also delayed in cows nursing calves. The suckling stimulus of a calf alters the level and release of hormones necessary for re-initiation of estrous activity in nursing cows. Calf removal for either a

short period of time or permanently will often hasten resumption of estrous activity.

There are three main methods of calf removal: 1) short-term calf removal (48-hour calf removal), 2) once-daily suckling and 3) early weaning of the calf. Different situations will dictate which method of calf removal should be used. Each method will be discussed along with when to use various calf removal programs.

Short-Term Calf Removal

Calves are removed from the cows for 48 hours usually at the start of the breeding season. Calves should be secured in a pen or holding area that will not permit nursing activity. Cows tend to remain calmer if they can see their calves. Feed, hay and clean water should be provided to the calves to minimize stress, although young calves (< 65 days) will consume very little feed or hay. Results using short-term calf removal have been extremely variable. Some producers report outstanding results, while others experience little if any success. In order for short-term calf removal to successfully initiate estrous activity in the majority of the cows treated, several conditions need to be satisfied. Cows should

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 2. Hansen, G.R., Assistant Professor of Animal Sciences, North Florida Research and Education Center Marianna, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

1. Be In moderate body condition (> 4.5).
2. Be at least 45 days postpartum.
3. Have gained weight prior to the start of the breeding season.
4. Have not resumed normal estrous activity following calving.

The effectiveness of short-term calf removal is illustrated in Table 1. Cows in this herd were in body condition score 5 or better, 45 to 60 days postpartum, were gaining weight at the start of the breeding season and had not been observed in estrus prior to short-term calf removal. All cows were artificially inseminated 12 hours after estrus was observed. Notice that 80% of the cows exhibited estrus while the calves were removed. This resulted in an increased number of cows conceiving on the first day of the breeding season, which ultimately resulted in more pounds of calf weaned. First service conception rate was also above average in these cows.

Some researchers, however, have shown no benefit from using short-term calf removal. Other researchers have demonstrated that short-term calf removal can increase pregnancy percentage when coupled with estrus synchronization/artificial insemination regimes (~5 to 6%). Research conducted in Colorado (Table 2) found that short-term calf removal combined with a synchronization protocol increased pregnancy rates by 12 to 16 percent over control or animals treated only with the synchronization treatment (Yelich et al., 1995). One of the principal benefits of short-term calf removal is to increase the number of early calving cows, which in turn increases weaning weight per cow exposed. In studies where short-term calf removal has been used in production systems, weaning weights increased by approximately 90 pounds per calf. Thirty to eighty percent of females subjected to short-term calf removal will resume estrus activity within approximately 20 days depending on nutrition stress, animal age and days postpartum (Sprott, 2003). Pregnancy rates in the first 21 days of breeding following short-term calf removal will double compared to females whose calves are not removed (Sprott, 2003).

Insure adequate time for calves to “mother-up” inside a trap or pen, especially if the herd is to be moved to a new pasture or be transported. Calves should be observed for scours for a few days following short-term calf removal. In some instances, calves may have “milk scours” upon being returned to the herd. If scours persist longer than a day, treatment should be administered.

Some producers feel that removing calves for 72 hours increases estrus response and pregnancy rate. There are no data to support this hypothesis. If cows are exposed through natural service, adequate numbers of fertile bulls need to be available in order for short-term calf removal to be successful. Use caution if cold or rainy weather is expected during the period of calf removal. Reschedule when milder weather is forecast. Cows under extreme nutritional stress do not respond well to short-term calf removal. Producers who routinely use short-term calf removal have shown benefits from year to year even when cows are in good body condition and are experiencing minimal nutritional stress. Short-term calf removal will provide a “jump start” to those cows that are close to re-initiation of cyclicity following calving. Cows that have returned to cyclicity prior to short-term calf removal, will fail to respond.

Once-Daily Suckling

With once-daily suckling, calves are allowed to nurse only once a day. Calves are sorted off of their mothers beginning at 45 to 60 days of age. Calves are turned in with the cows for 35 to 40 minutes per day. The cows are then turned out to pasture and calves are either kept in a pen or turned out into a separate pasture. Once-daily suckling usually lasts for a period of 40 to 50 days. While separated from their dams, calves need to be provided with supplemental feed, high quality hay or high quality pasture. Calves should not be housed in crowded or dusty pens; instead provide access to pastures or traps. Provide adequate shade and shelter for calves that will be exposed to the weather. A major drawback of implementing once-daily suckling is the extensive daily labor required.

Cows will usually resume estrous cycling within 40 days following implementation of once-daily suckling. When implementing once-daily suckling, provide supplemental feed to cows that are under moderate nutritional stress. As with short-term calf removal, cows under extreme nutritional stress fail to respond well to once-daily suckling.

Early Weaning

As the name implies, early weaned calves are removed from their dams and either placed on feed or sold as light weight calves. This is the most aggressive and effective method of stimulating estrous activity in cows. Females that are under extreme nutritional stress will respond to early weaning when other methods of calf removal fail. Young females under moderate to extreme nutritional stress will benefit most from early weaning. Cows in which early weaning has taken place normally return to cyclicity within 2 to 3 weeks. Older cows also benefit from early weaning when exposed to extended periods of extreme nutritional stress.

Studies in Florida have shown early weaning to be an effective means for increasing body condition and improving percent pregnant while decreasing calving interval in young cows. Pregnancy percentage was increased by 39.5% (year 1) and 16.7% (year 2) in early-weaned, first-calf heifers over normal-weaned, first-calf heifers (Arthington and Kalmbacher, 2003). One drawback of early weaning is selling calves at a young age and light weights, thus reducing income. Some producers have overcome this obstacle by feeding and caring for the calves until they reach an acceptable market weight. Each producer will need to determine the optimal time to market these calves. However, in circumstances where feed resources for the cow herd are limited, it would benefit producers to consider this option in young cows nursing calves in order to maintain acceptable pregnancy rates.

It should be noted that calves between 80 to 90 days of age respond better to early weaning than younger calves do. Calves should be at least 60 days old when using early weaning. High quality grazing and supplemental feed should be available to calves at all times. Young calves may experience a high level

of sickness due to the stress of weaning and the naivety of their immune system. Calves need to be observed closely for the first 30 to 45 days after weaning. Appropriate facilities need to be available to decrease the risk of illness and provide adequate shelter from inclement weather conditions. If a producer determines to market the calves at an older age, labor and feed resources will need to be reviewed prior to weaning the calves. If labor is limited and facilities are poor, then producers using early weaning should market their calves when removed from their dam.

For more information using early weaning within your cow herd, access EDIS publication AN131, <http://edis.ifas.ufl.edu/AN131>.

Determining Which Method of Calf Removal to Use

In determining what type of calf removal to implement or whether to implement calf removal within a cowherd at all, the following factors should be considered:

1. Cow body condition score (> 4.5 on a nine-point scale). Cows in body condition score 4.5 or greater will respond to calf removal. Cows in less than body condition 4.0 will respond to only the most aggressive form of calf removal (early weaning).
2. Nutritional stress of the cow. Cows gaining condition have a greater response than cows losing condition.
3. Cow age. Young cows respond better than old cows. First-calf heifers are usually the cows that need calf removal the most. These females are very susceptible to nutritional stress. When feed resources are limited, some form of calf removal is necessary if acceptable pregnancy rates are to be achieved in these animals.
4. Postpartum interval (> 45 days). Cows need time for involution of the uterus to take place. Fertility will be reduced in cows that are less than 45 days from calving. Calves younger than 45 days will also be severely stressed if they are removed from their mothers for short periods of

time. If calves are early weaned, cows should be 70 to 90 days postpartum.

5. Availability of labor. Early weaning and once-daily suckling require more labor than 48 hour calf removal.
6. Facilities available to handle and house cows and calves. Facilities must be secure and free from dust and objects that could cause injuries to animals. Shade and shelter should be provided to minimize the effects of inclement weather. Fresh water and clean feed should be available at all times. Facilities must be secure enough to prevent calves from nursing their dams.
7. The development and implementation of a comprehensive herd health program (vaccinations, deworming, etc.). Appropriate animal hygiene must be practiced.

Table 3 summarizes different scenarios that cow-calf producers will be subjected to in the course of normal operations and makes recommendations as to the most appropriate method of calf removal to use. Producers need to assess their resources and apply the method of calf removal that would provide the greatest return.

Calf Performance Following Calf Removal

Calves that are early weaned and those nursing once daily show decreased weight gains in the first 20 to 30 days following removal from the cow. With adequate nutrition and care, these calves resume normal growth and attain weights similar to normal weaned calves (Arthington and Kalmbacher, 2003; Sprott, 2003). Research has shown that early weaned calves that are backgrounded prior to arrival in the feedlot have better gains the first 21 days of the feeding period and experience less morbidity than normal weaned calves.

Researchers from the University of Illinois have shown that in properly managed, early-weaned calves, the percent grading USDA choice is improved over normal-weaned calves. Other researchers have shown no difference in carcass traits when comparing early-weaned calves versus normal-weaned calves.

Performance in calves removed for 48 hours from their dams typically shows a temporary weight reduction, but this weight is recovered in 10 to 14 days (Sprott, 2003).

Summary

Calf removal is an inexpensive way cattle producers can increase the percentage of cows calving in the first 21 days of the calving season. Remember, calf removal works best in cows that are gaining weight, are in moderate body condition, are at least 45 days postpartum and have not resumed cyclicity. Using the principles that have been outlined in this publication, producers should be able to determine when to implement calf removal and what type of calf removal to use in their cow herds. As with all production practices, calf removal will not overcome poor management.

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Table 1. Estrus Response, Pregnancy Rate and First Service Conception Rate in Beef Cows Following Short-term Calf Removal.

Number Cows	No. Exhibiting Estrus During Short-Term Calf Removal	% Pregnant	First Service Conception Rate
60	48/60 (80%)	60% (36/60)	75% (36/48)
Hansen, Unpublished data			

Table 2. Effect of Synchronization Treatment With or Without Calf Removal on Estrus and Pregnancy Rates.

Treatment	5 Day Estrus Rate	Synchronized Conception Rate	25 Day Pregnancy Rate
Control	34.5%	89.4%	78.2%
MGA-PGF	64.8%	68.6%	74.7%
MGA-PGF-CR	61.8%	85.3%	90.9%
MGA = melengestrol acetate PGF = Prostaglandin F2a CR= 48 hour calf removal (Yelich et al., 1995)			

Table 3. Determining Which Method of Calf Removal to Use.

Cow Age ^a	BCS ^b	Days Postpartum	Labor	Nutritional Stress ^c	Facilities	Calf Removal Method ^d
Young	≤ 4.0	≥ 60	Limited	S	Poor	EW
Young	≥ 5.0	≥ 45	Limited	M	Average	STRC
Young	≥ 4.5	≥ 45	Unlimited	M	Good	ODS
Mature	≥ 4.5	35-45	Limited	M	Average	STRC
Mature	≤ 4.0	≥ 45	Limited	S	Average	EW
Mature	> 5.0	> 60	Limited	N	Poor	STRC
Aged	> 5.0	> 60	Limited	S	Average	EW/STRC
Aged	< 4.5	35-60	Limited	S	Poor	EW
Aged	> 4.5	35-45	Unlimited	M	Average	ODS/STRC

^aCow Age: Young = 2-3 years old; Mature = 4-9 years old; Aged = 10+ years old^bBody Condition Scores: 1 = emaciated, 9 = obese^cNutritional Stress: S= Severe; animals are losing body condition, M= Moderate; animals are maintaining body condition, N= Negligible; animals are gaining body condition.^dCalf Removal Method: EW= Early wean; ODS= Once-daily suckling; STRC = 48 hour calf removal.