



Western Beef Resource Committee

Cattle Producer's Library

Reproduction Section

CL413

Rebreeding the First-Calf Heifer

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Rebreeding performance of first-calf heifers has major economic consequences. This classification of breeding animal is often the most challenging to manage for reproductive efficiency, primarily because this animal is not only subject to the stresses of calving and lactation for the first time, but she is also still growing.

Failure to rebreed after birth of the first calf is one of the primary reasons for culling in a beef cattle operation in the western United States. There is a considerable amount of money invested in this animal, and high replacement rates can greatly decrease the profitability of a beef cattle operation.

Herd Health

A sound herd health program is an essential part of any reproductive management system. Cattle are susceptible to a variety of diseases that are detrimental to reproduction (see the Animal Health section for papers on specific diseases associated with reproductive failure and abortions).

All herd health programs should be implemented under the supervision of a qualified, licensed veterinarian. A relationship exists between poor nutrition and increased incidence of herd health problems. Several vitamins and minerals are necessary for immune system function, and nutrient deficiencies in these areas can result in an increased susceptibility to disease.

Breed Heifers to Calve Earlier Than the Cow Herd

Properly developed and managed beef heifers generally have a 20- to 30-day longer postpartum interval (interval from calving until fertile estrus) than older cows. The practice of breeding virgin heifers 20 to 30

days earlier than the cow herd will allow the heifer additional time to return to estrus and rebreed with the older cows the next year.

It is important to manage these heifers separately for two reasons: (1) earlier calving will likely mean that pastures are not available as soon and additional nutrients will need to be supplied, and (2) nutrient requirements (% of ration) are higher for first-calf heifers than for mature cows (see CL300, "Nutrient Requirements of Beef Cattle"). Breeding heifers early will be of no benefit if they are not properly managed after calving.

Minimize the Postpartum Interval

The period from calving until the cow conceives is critical in a cow's production cycle. Minimizing this time period is critical for maximizing reproductive and economic efficiency of a beef cattle operation.

Cows that cycle early in the breeding season have more opportunities to become pregnant during a limited breeding season. By keeping other factors constant, such as genetics, age of dam, and nutrition, cows conceiving early in the breeding season generally have older calves that have heavier weaning weights. The length of breeding season will influence uniformity of calves and their value at weaning. In order to have a successful, short breeding season, it is vital that cattle cycle and conceive early in the breeding season.

The ability to minimize the postpartum interval is limited by uterine involution, which is the time needed for repair of the reproductive tract so another pregnancy can be established. Uterine involution generally occurs within 30 days postpartum and does not generally limit cyclicity, however, factors such as malnutrition, disease, and calving difficulty may delay normal involution.

Body Condition Score

Body condition is correlated with several reproductive events such as postpartum interval, services per conception, calving interval, milk production, weaning weight, calving difficulty, and calf survival. Body condition can greatly affect net income on a cow-calf operation (Table 1).

Body condition at calving is the single most important factor controlling when a beef heifer will cycle after calving (see CL720, "Condition Scoring of Beef Cattle," and CL331, "Effect of Prenatal Nutrition on Subsequent Cow and Calf Performance"). Heifers should have an optimum body condition of 5 or 6 at calving through breeding to assure optimal reproductive performance. Body condition score is generally a reflection of nutritional management, however, disease and parasitism can contribute to lower body condition scores even if "apparent" nutrient requirements are met.

Nutritional Management

Feeding a balanced ration to heifers in the last trimester of pregnancy through the breeding season is of critical importance (see CL300, CL310, "Ration Balancing," and CL331). Nutritional demands increase greatly in late gestation and even more in early lactation. Reproduction has low priority among partitioning of nutrients and consequently, cows in thin body condition often don't rebreed. Plane of nutrition the last 50 to 60 days before calving has a profound effect on postpartum interval (Tables 2 and 3).

The importance of pre- and postpartum protein and energy level on reproductive performance has been consistently demonstrated (Table 2). Positive energy balance postpartum is essential for prompt rebreeding of heifers that calve in thin condition (Table 4).

Research at the Livestock and Range Research Laboratory at Miles City, Montana, has demonstrated that fat from oilseed sources fed prepartum to heifers increased conception rates and tended to increase calf weaning weights. Beef cattle do not have a fat requirement per se, but it is possible that providing this nutrient at times of high nutrient demand such as pre- and/or postpartum may increase reproductive efficiency.

Feeding a balanced ration the last trimester of pregnancy will decrease calving difficulty. Heifers fed diets deficient in energy or protein the last trimester not only experience more calving difficulty, but typically breed back later in the breeding season and have increased sickness and death, and wean lighter calves (Table 3).

Caution should be used with feeding excessive amounts of nutrients before or after calving. Not only is it costly, but animals with excess body condition (more than 7) have lower reproductive performance and more calving difficulty than animals in moderate body condition (5 or 6).

Table 1. Relationship of body condition score (BCS) to beef cow performance and income.

BCS	Pregnancy rate (%)	Calving interval (days)	Calf ADG (lb)	Calf WW (lb)	Calf price (\$100/lb)	\$/cow exposed ¹
3	43	414	1.60	374	96	154
4	61	381	1.75	460	86	241
5	86	364	1.85	514	81	358
6	93	364	1.85	514	81	387

¹Income per calf x pregnancy rate.

Table 2. Effect of pre- or postpartum dietary energy or protein on pregnancy rates in cows and heifers.

Nutrient and time	% pregnant	
	Adequate	Inadequate
Energy level precalving ^a	73	60
Energy level postcalving ^b	92	66
Protein level precalving ^c	80	55
Protein level postcalving ^d	90	69

^{a,b,c,d}Combined data from 2, 4, 9, and 10 studies, respectively.

Table 3. Effects of feed level during gestation on calving and subsequent reproduction.¹

Item	Gestation diet of dam	
	Low	High ²
Calf birth weight (lb)	63	69
Dystocia (%)	35	28
Calf survival (%)		
At birth	93	91
Weaning	58	85
Scours (%)		
Incidence	52	33
Mortality	19	0
Dam traits		
Estrus (before breeding season) (%)	48	69
Pregnancy (%)	65	75
Precalving pelvic area (cm ²)	256	271

¹Averages from seven studies.

²Diet level fed from up to 150 days precalving; low and high, animals lost or gained weight precalving, respectively.

Table 4. Influence of postpartum diet on weight change, condition score (CS) change, and postpartum interval (PPI).

Item	Diet			
	Low	Maintenance	high	High
Weight (lb)	835	822	826	821
Condition score	4.27	4.26	4.18	4.10
PPI (days)	134	120	115	114
PPI wt. change (lb)	12	40	70	77
PPI CS change	-.32	.37	1.24	1.50

Table 5. Effect of time of calving assistance on dam breeding and calf performance.

Item	Time of assistance	
	Early	Late
Postpartum interval (days)	49	51
In heat at beginning of breeding season (%)	91	82
Services/conception	1.15	1.24
Fall pregnancy (%)	92	78
Calf average daily gain (lb)	1.74	1.63
Calf weaning weight (lb)	422	387

Table 6. Effect of ionophore feeding on postpartum interval (PPI) in beef cows and heifers.

Study	Ionophore (PPI, days)	Control (PPI, days)	Difference (days)
1	30	42	12
2	59	69	10
3	67	72	5
4	65	86	21
5	92	138	46

Overfeeding protein during the breeding season and early gestation, particularly if the rumen receives an inadequate supply of energy, may be associated with decreased fertility. This decrease in fertility may result from decreased uterine pH during the luteal phase of the estrous cycle in cattle fed high levels of degradable protein. The combination of high levels of degradable protein and low energy concentrations in early-season grasses may contribute to lower fertility rates in females placed on such pastures near the time of breeding.

Calving Difficulty and Time of Intervention

Research in Montana has shown that cows that experience calving difficulty will take longer to cycle than cows not experiencing calving difficulty, therefore, it is important to minimize calving difficulty in your breeding herd. Time of intervention, when obstetrical assistance is needed, also affects cyclicity.

Dams given early assistance had a reduction in postpartum interval, a higher percentage in heat by the beginning of the breeding season, a trend toward fewer services per conception, an increase in fall pregnancy rate, and heavier calves at weaning (Table 5). Early assistance when needed, therefore, is important to assure heifers return to estrus as soon as possible.

Suckling Stimulus

Suckling stimulus from the calf has a negative effect on cyclic activity during the postpartum period, however, animals on a positive energy balance and in adequate body condition generally overcome this negative stimulus before the breeding season.

Calf Removal

Calf removal, either temporary or permanent, can increase the number of cows that return to estrus during the breeding season. A common practice in some synchronization programs is 48-hour calf removal, which has been shown to induce cyclicity in postpartum cows and first-calf heifers. It is important to provide a clean, dry pen with grass hay and water, and to make sure that pairs “mother-up” before going to pasture.

Ionophores

Ionophores such as Bovatec® and Rumensin® have been shown to influence reproductive performance dur-

ing the postpartum period. Cows and heifers fed an ionophore exhibit a shorter postpartum interval provided adequate energy is supplied in the ration (Table 6). This effect appears to be more evident in less intensely managed herds that generally have a moderate (60 to 85 days) or longer postpartum interval. Scientists have also demonstrated that heifers fed an ionophore reach puberty at an earlier age and lighter weight.

Induction of Estrus with Hormones

Progestin containing products such as MGA (melen-gesterol acetate) or Syncro-Mate B protocol can shorten the postpartum interval provided that nutrition and body condition are adequate. Gonadotropin releasing hormone (GnRH/prostaglandin protocol) is another hormone used in synchronization programs (see CL405, “Synchronizing Estrus in Beef Cattle”), which will induce estrus in some heifers. None of these products are substitutes for good management. Heifers need to be at least 40 days postpartum before they will induce cyclicity.

Bull Presence

Bull presence from 30 days after calving to the start of the breeding season has been shown to cause heifers to cycle earlier. Bull exposure requires exposing heifers to surgically altered bulls that are not capable of breeding. Approximately one bull per 20 heifers is required, and limited data suggest exposure to androgenized steers or cows will produce similar results.

Summary

1. A sound herd health program is essential for optimum reproductive efficiency.
2. Breed heifers 20 to 30 days before the cow herd.
3. Make sure heifers are on a balanced ration the last trimester of pregnancy through the breeding season.
4. Heifers should be in optimum body condition (5 or 6) at calving and through the breeding season.
5. Provide calving assistance in a timely manner when needed.
6. Use an ionophore for increased feed efficiency, coccidiosis control, and the positive affect on reproductive performance.
7. Progestins, GnRH, 48-hour calf removal, and bull exposure are management tools that can induce cyclicity in some heifers.

Several management practices can assist in shortening the postpartum interval, but none of these recommendations will take the place of good management. Body condition, level of nutrition, age of cows, milk production, weather, disease, parasites, and other factors will affect the ability to shorten the postpartum interval. The first place to address this problem is with proper nutrition before calving and through the breeding season and managing for optimum body condition.

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