

Tame the Terrible 2s:



PHOTOS BY SHAUNA ROSE HERMEL

Tips for Rebreeding First-Calf Heifers

Most females failing to conceive or conceiving late are 2-year-old first-calf heifers in their second breeding season. Once they get behind, it's hard for them to catch up on profitability. The best way to make up the difference is never to lose it.

BY BRAD PARKER

A heifer's worth today is equal to all her future earnings, minus her expenses, discounted to the buying power of today's dollar. And unless she's trained to do circus tricks, there are only two ways she's going to earn a living: produce beef or become beef.

If she's going to make a career of being a brood cow, it's important that she raise a calf each and every year. The odds of her coming up short on the rent are greatest when she's 2 years old and it's time to conceive her second calf.

Pregnancy failure costs approximately \$280 (the typical annual cost of maintaining a female) instead of earning \$123 in an average year for calf sales, says Harlan Hughes, professor emeritus of agricultural economics at North Dakota State University.

The discounted present value of the \$403 total is \$351, which is the opportunity cost of an open heifer. That value illustrates the importance of getting first-calf heifers rebred, Hughes says.

When a heifer doesn't rebreed, the cost of keeping her for a year must be absorbed by the females that do raise a calf, explains Ken Odde, a faculty affiliate in animal sciences at Colorado State University. If she conceives during her next estrous cycle, her calf will lose 21 days of growth against a common weaning date. Either way, she's not living up to her profit potential.

If she's going to do her job year in and year out, she must become pregnant within 85 days of calving.

Physiological challenges

Rebreeding is a heifer's lowest priority, says Richard Evans, superintendent of the Mississippi Agricultural and Forestry Experiment Station's Prairie Research Unit. She first will use nutrients to stay alive, then to produce milk.

"Only after she reaches her genetic maximum for milk production and meets her requirements for maintenance and growth will she repartition energy for reproduction," Evans says. When the brain detects low energy levels, it shuts down the production of reproductive hormones.

The heifer will not cycle again until blood energy levels are high enough to meet all her requirements. "Low blood energy, as a result of poor body condition at calving, generally is the cause of rebreeding failure," Evans suggests.

Compounding the problem is the fact that a first-calf heifer just overcame the greatest physiological stresses of her life. Fetal development, parturition, lactation and reproductive-tract repair require a lot of energy, says Glenn Selk, professor of animal science at Oklahoma State University.

Most 2-year-olds and some 3-year-olds still are growing themselves while providing milk for their calves. The 2-year-olds are losing their baby teeth and are not yet good foragers, Selk adds, so many go into the breeding season with reduced intakes.

As intake falls short of the high energy requirements, the heifer compensates by mobilizing the energy stored in fat. Over several weeks, a noticeable change in her appearance occurs. Selk says this change can be quantified by using body condition scores (BCS).

Weighty considerations

The process of getting heifers to rebreed starts even before they're bred the first time.

Odde says feeding heifers so they weigh about 65% of their breed's average mature weight one month before the breeding season enhances the odds of early

CONTINUED ON PAGE 40

Above: Only after a heifer reaches her genetic maximum for milk production and meets her requirements for maintenance and growth will she repartition energy for reproduction, says Mississippi State University's Richard Evans.



Young cows that calve at BCS 3 or 4 can't gain enough condition to achieve the same rebreeding performance as cows that calve at BCS 5 or 6.

conception, which will help them keep to the same schedule as the more mature cows in subsequent years.

Rates of gain of 1.5-1.7 pounds (lb.)/day would meet the needs of most heifers, says Stephen Boyles, associate professor of animal sciences at Ohio State University.

The rate of gain doesn't need to be constant as long as the target weight is reached, Boyles says, adding, "Individual weights rather than group weights should be considered for replacement heifers. If a group of similar-breed-type heifers averages 650 pounds, that means some may be lighter and not ready for breeding. Factors such as genetics, calving date and even inadequate bunk space could be the reasons for the variation in weight."

A 2-year-old should weigh about 85% of her mature weight at first calving, Boyles continues, which means she has approximately 280 days (at 0.7-1 lb./day) to

gain the weight between breeding and calving.

This doesn't mean feed quantity is more important than quality, however. A balance of required nutrients — energy, protein, vitamins and minerals — should be available to heifers at all developmental stages. Evans reminds producers that this is especially true for first-calf heifers. If they're on a hot mix, make sure a complete mineral is included.

Rob Thomas, Thomas Angus Ranch, Baker City, Ore., analyzes his feed 30-45 days before the breeding season starts to determine supplement needs. "Nutrition is the number one thing we need to look at," he says of managing first-calf heifers. "Often, the primary deficiency is energy."

Be careful not to mistake frame for weight, Boyles warns. Large-framed heifers with below-average body condition may be hard keepers in the future.

Condition is key

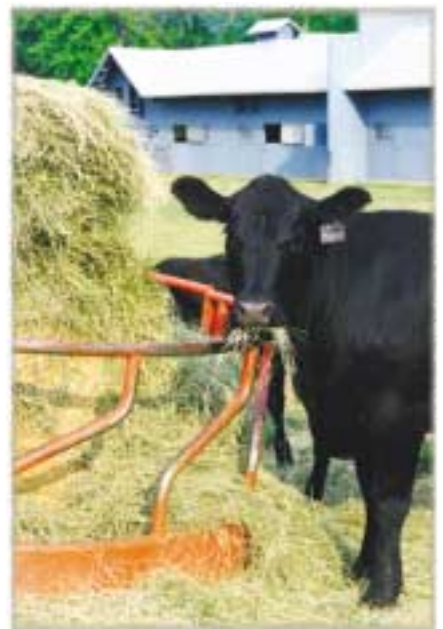
That returns the spotlight to BCS, or making sure heifers have enough fat when they need to mobilize it.

Females that calve in thin body condition but regain weight and condition going into the breeding season do not rebreed at the same rate as those that calve in good condition and maintain it through the breeding season, Selk explains.

In a 1990 Oklahoma State study using Herefords and Angus-Hereford-crosses, rebreeding performance was significantly lower for heifers that were thin at parturition compared to those in adequate condition. While 91% of the heifers maintaining good condition from calving through the breeding season conceived, only 67% of their thin herdmates rebred.

Young cows that calve at a BCS of 3 or 4 (on a 9-point scale) can't gain enough condition to achieve the same rebreeding performance as cows that calve at BCS 5 or 6 and that maintain or lose only a slight amount of condition, Selk emphasizes (see Table 1).

That's why the University of Illinois at Urbana-Champaign evaluates its heifers' BCS 60 days before calving. The goal is to make certain that heifers will score 5 or 6 when they calve, says Doug Parrett, the Extension beef cattle specialist who's in charge of the university's purebred research herds, including 120 registered Angus females.



The average interval from calving to first estrus is 49 days in older cows and 67 days in younger cows with nursing calves.

Table 1: Predicted number of days from calving to first estrus as affected by BCS at calving and BCS change after calving

BCS at calving	BCS change from calving to Day 90						
	-1	-0.5	0	0.5	1	1.5	2
3	189	173	160	150	143	139	139
4	161	145	131	121	115	111	111
5	133	116	103	93	86	83*	82
5.5	118	102	89	79	72	69	66

*Cows must conceive within 85 days of calving to maintain a 365-day calving interval.

Source: Adapted from Lalman, 1997, by Selk.

"Producers think they look fine until they calve," Parrett says, reminding cattlemen that a lot of a pregnant heifer's weight is in fetal fluids and tissues.

If a heifer calves at BCS 3 or 4, it is virtually impossible to feed her enough early in lactation to get her to increase BCS and to produce milk while continuing to grow, Evans warns, adding it is easier to increase condition before calving. It's also cheaper, so economics would recommend that producers put fat on cattle when their energy demands are low, which is during their dry period.

Improving BCS before calving from 3 up to 6 has been shown to raise rebreeding rates from 17% up to 90% in first-calf heifers, Evans says. There is no improvement in rebreeding rates beyond BCS 6, and overfeeding well-conditioned heifers is a waste of money and has the potential to increase calving problems.

For this reason, Evans suggests separating heifers in better condition from those in poorer condition. Overfeeding can be avoided while allowing those that are thinner to add condition, increasing their potential milk production and rebreeding percentages.

Although condition at calving has a greater effect on rebreeding than the subsequent nutrition program, it's still important to maintain females so they don't slip more than 1 point after calving. In other words, they should be managed to go from BCS 6 to no lower than BCS 5, Evans says.

But losing a little condition may be a good thing. As body fat is metabolized, its main derivative is propionic acid, which triggers puberty when it occurs in the rumen in an elevated level. Evans says it would appear possible that the breakdown of body fat also would help trigger estrus to allow for rebreeding.

A bad idea

In an attempt to decrease calving problems, some producers allow heifers to lose condition and to calve at a BCS of less than 5 so the calf's birth weight will be lower.

But Evans reminds producers that heifers still are growing, have maintenance needs, have to battle environmental stresses and must produce milk. There is little validity to withholding feed from heifers to make their calves smaller at birth, he says. The strategy generally leads to a weak heifer and a weak calf.

"Is there any doubt why many heifers do not rebreed as 2-year-olds [after this experience]?" Evans asks.



Although condition at calving has a greater effect on rebreeding, it's still important to maintain females so they don't slip more than 1 point after calving.

In fact, purposely decreasing BCS may backfire. Boyles says inadequate nutrition creates more calving difficulty in heifers than excess nutrition does.

Limiting nutrients to the heifer usually affects calf birth weight only slightly. The heifer will sacrifice body condition and arrest her own growth before diverting many nutrients from the fetus, he says. Her thin condition then will affect her breed-back performance.

The dystocia factor

Reducing calving difficulty (dystocia) is an important strategy in maintaining rebreeding rates. Cattle suffering from dystocia experience 16% lower pregnancy rates during the next breeding season, Selk reports.

Heifers receiving assistance in early Stage 2 of parturition return to estrus earlier in the post-calving period and have higher pregnancy rates than heifers receiving traditionally accepted obstetric assistance, he continues.

Young cows that are allowed to endure a prolonged labor (more than one hour) often deliver a weak calf and have a 20% lower rate of cycling at the start of the next breeding season, Selk says. In addition, the rebreeding percentage is 17% lower than for counterparts that were given assistance in the first hour of labor.

For all of these reasons, Parrett is careful

to use only high-accuracy calving-ease sires to breed the new heifers in his charge. Eliminating the calving problems helps reduce the rebreeding challenges.

Feeding heifers to achieve 85%-90% of their expected mature weight at first calving can reduce the incidence of dystocia, Evans says.

Of course, waiting to breed heifers so they first calve at 30 months of age will get them even closer to their mature weight. Graham Angus Farm, Albany, Ga., has been using that strategy in its spring-and-fall-calving herd for 3-5 years, says Bill Graham, president. He adds they've posted better calving and rebreeding rates mainly due to the decrease in calving problems.

"It's really been worthwhile," Graham says. "Just a few percentage points help you a lot."

Still, despite a producer's best efforts, 80% of difficult calvings probably will involve first-calf heifers. Evans recommends isolating them just before calving to facilitate observation.

Advanced calving

To make observations easier, heifers should be bred so as to calve 20-30 days before the mature cow herd, Boyles says. The producer then can spend more time checking for and assisting with calving problems. This labor-management tip isn't the only reason to breed them early.

The average interval from calving to first estrus is 49 days in older cows and 67 days in younger cows with nursing calves, he explains. Early-calving heifers should have a month longer to recover from parturition and to rebreed so they can have their second calves with the rest of the herd.

Data from Kansas State University show that for every 10 days since calving (up to 70 days), the percentage of cows cycling before the breeding season increases 7.5%.

If a heifer calves late, she likely will calve late the rest of her life or miss at least one pregnancy, Boyles says. Since that's exactly what producers want to avoid, heifers should be given every chance to rebreed as soon as possible.

Yet only the first of those chances should include artificial insemination (AI), Parrett recommends. In other words, give it one shot, then put 2-year-olds with a cleanup bull. While he admits this may limit planned genetic improvement, heifers' varied rates of return to estrus almost necessitate natural service to assure

CONTINUED ON PAGE 42

rebreeding. And any calf is worth more than no calf at all.

Early weaning

Breeding and calving aren't the only events that can be moved up to give heifers a head start on rebreeding.

Evans suggests that weaning calves at 4-6 months of age may provide young cows with 30-45 days of additional rest before their second calving.

Many times, he says, heifers are just pacifiers after their calves are 6 months old because their milk production drops after that, and they may be almost dry by then.

Evans cites research indicating a cow needs at least a 60-day dry period before she calves. More than this allows her to increase her BCS, which will help in future milk production and rebreeding.

A large percentage of early-weaned cows will have a short first estrous cycle (10-12 days) after weaning, Selk says, because removal of nursing calves also causes hormonal changes that stimulate estrus.

He goes on to explain that while weaning calves at 4-6 months of age may be a generally used practice in most herds, a more radical form of early weaning can be incorporated as an "absolute-disaster relief program" when 2-year-olds are extremely thin (BCS 4 or less).

To maintain a 365-day calving interval when heifers are in dire straits nutritionally, calves should be weaned by 80 days of age, Selk advises, adding that calves as young as 40 days of age will not require milk replacers and can eat dry feed. The age range in any given group of early-weaned calves should be kept as narrow as possible, though, because smaller, younger calves may have trouble competing for feed and water.

Very-early weaning has been shown to raise conception rates of thin first-calf heifers from 50% up to 97% and to shorten time to first estrus by 17 days, Selk relates. Heifers in poor condition whose calves are weaned this early are heavier by normal weaning time than were those that raised their calves to normal weaning (see Table 2).

"This is the last-ditch effort to keep the heifers in the herd," Selk says of weaning calves at 40-80 days of age. Of course, that creates an entirely different set of calf-management issues, he reminds producers.

Temporary separation

Sometimes just reducing a calf's reliance on its mama can be enough.

"You need to be aware of how your cattle are cycling before the breeding season."

—Rob Thomas

Removing calves for 48 hours has been shown to improve conception rates of moderately conditioned cows by 4%-8%, Selk says. Short-term calf removal can be used at the first of the breeding season, in the middle or at both points in time, depending on available labor.

Thomas says he removes calves temporarily when his herd's cycling rate seems low. "You need to be aware of how your cattle are cycling before the breeding season," he advises.

The Oregon cattleman says it's important to keep plenty of fresh water and feed available to the calves while they're separated from their mothers and to make sure they nurse after the reunion.

Though not harmful to them, Selk explains, early weaning or short-term calf removal will not show significant advantages for cows that calve in BCS 6 or greater. They can be expected to return to estrus early in the breeding season and should have high rebreeding rates on their own.

Other strategies

Creep-feeding calves is another way to reduce the nutritional demands on the cow, enabling her to use more energy for rebreeding, Evans says. He cautions producers that creep gates must be

constructed so only calves have access to the feed. The mothers also like the concentrate and will go to great lengths to get it. This can be an unnecessary expense and can cause the cows to put on too much condition.

However, there are times when supplementing the young mothers' diets may be warranted, Parrett says, adding weight to the case for segregating first-calf heifers.

"Sort them, and do something about it," he emphasizes. "You have to be prepared to give them more supplemental feed after calving." This is especially true when extreme weather or other stressors impose added nutritional taxes on the heifers.

Even though a producer may be looking at only 10-15 first-calf heifers in a herd, sorting is worthwhile, Parrett says. He estimates 99% of rebreeding failures are caused by one-size-fits-all management practices.

Graham also likes to sort off first-calf heifers so they gain a nutritional advantage. He turns his heifers out to pasture several days before the mature cows so the younger females get first shot at the higher-quality forage.

"When they're growing and raising that calf, too, they need all the help they can get," he explains.

Thomas also employs sorting, but his is done at pregnancy-checking time, and it's a keep-cull situation. All females are given an adequate postpartum period, then they're expected to conceive during a 25-day breeding season. Those that don't conceive have to find a new place to work. "You give a cow every chance you can, but don't make excuses for her," he says.

The selection pressure has resulted in cattle that are reproductively sound in their environment, Thomas explains. "We find that through proper breeding and nutrition, [first-calf heifers] aren't that difficult to rebreed."

Not out of the woods yet

Evans reminds producers that cows continue to grow until they are 4 or 5 years old. Nationwide, almost as many 3-year-olds come up open as 2-year-olds, he says, so both groups should be managed with equal intensity and, if possible, as a single unit.

Managing 2- and 3-year-olds together is better than mixing 3-year-olds with the mature cows because the younger cows frequently get pushed away from feed, and that keeps them from earning their keep.

Table 2: Effects of early weaning on extremely thin, first-calf heifers' performance

	Normal weaning	Early weaning*
Weight, lb.		
at early weaning	698	680
at end of breeding	746	753
at normal weaning	788	875
Conception rate, %	59	97
Days to first estrus	91	73

*Calves were weaned at 6-8 weeks of age.

Source: *Lusby and Wettemann*, 1980 OSU Animal Science Research Report.

