

# Tame the Terrible 2s:

## *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.**

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 on 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 provide milk for her calf.

"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 concludes.

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. In the case of 2-year-olds, the young mothers are losing their baby teeth and are not yet good foragers, Selk adds. Therefore, many heifers go into the breeding season with reduced intakes.

As intake falls short of the incredibly 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 before they're even bred the first time.



Young cows that calve in BCS 3 or 4 cannot gain enough condition to achieve the same rebreeding performance as cows that calve in BCS 5 or 6.

Odde says feeding heifers so they weigh about 65% of their breed's average mature weight by one month before the breeding season enhances the odds of early 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, especially for first-calf heifers. If they're on a hot mix, make sure a complete mineral is included.

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 Hereford and Angus-Hereford-cross heifers, 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 herd-mates rebred.

**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.

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

"Once a heifer has calved in a poor 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 holding back feed from heifers to make their calves smaller at birth, he says. The strategy generally leads to a situation in which the heifer and her calf both are weak at calving.

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

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 returned to estrus earlier in the post-calving period and had higher pregnancy rates than heifers receiving traditionally accepted obstetric assistance, he continues.

Young cows that were allowed to endure a prolonged labor (more than one hour) often delivered a weak calf and had

a 20% lower rate of cycling at the start of the next breeding season, Selk says. In addition, the rebreeding percentage was 17% lower than for counterparts that were given assistance in the first hour of labor.

Many calving problems can be eliminated if heifers are 85%-90% of their expected mature weight at first calving, Evans says. Yet he still recommends isolating first-calf heifers just before calving to facilitate observation for signs of dystocia. Despite a producer's best efforts, 80% of difficult calvings probably will involve first-calf heifers.

### Advanced calving

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

The average interval from calving to first estrus is 49 days in older cows and 67 days in young 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.

### 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 shortens 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.

### Other strategies

Sometimes just reducing a calf's reliance on its mama can be enough of a nudge for rebreeding.

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

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

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

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

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

the middle or at both points in time, depending on available labor.

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

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.

### 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.