



PHOTO BY KIM KANZLER-HOLT

Measuring Up

How do you improve reproductive performance in a beef herd? Through a healthy reproductive program says this DVM.

by Kim Kanzler Holt

Good nutrition, heifer development, natural and/or artificial service, vaccination and disease control programs are all part of a healthy and efficient reproductive program, says Mike Lathrop, an independent beef cattle veterinary consultant from Joseph, Ore. Lathrop, a veterinarian whose background

includes 23 years of practice and eight years of work with an animal health company, says that reproductive success means a pregnancy and a live calf produced every year. Reproductive failure, on the other hand, is represented by open and late-bred cows and those that abort prior to calving.

Success —————
A pregnancy and a live calf produced every year

Failure —————
Open and late-bred cows and those that abort prior to calving



Reproductive success defined
Lathrop says these factors define reproductive success:

- Yearling replacement heifers that cycle and become pregnant early in their first breeding season;
- Wet 2-year-olds that breed back;
- Younger females that annually calve after limited fixed breeding seasons until at least breakeven age; and
- Herd longevity that minimizes annual replacement rates.

To increase the opportunity for herd reproductive success, Lathrop advises producers to always start with replacement heifers. Be sure heifers reach 65% of their mature weight at breeding and give them about a month head start on the mature herd at calving so they have time to recover afterward.

“Institute a vaccination program early,” he says. Vaccinate after weaning with a 5-way viral, which should include infectious bovine rhinotracheitis (IBR) and bovine viral diarrhea (BVD) Types I & II, and a 5-way lepto. Vaccinate again prebreeding for vibrio and give another 5-way viral and 5-way lepto. Follow up with a good nutrition program, annual vaccination program and disease control, he advises.

Nutrition’s importance

Good nutrition plays a leading role in reproductive success. Calving season is the time to double a herd’s numbers. In order to do just that, a cow must first cycle, conceive and maintain pregnancy. Once successfully born, her calf must then stay healthy through weaning. Lathrop says nutrition is a big part of this process.

“To get cows to cycle, nutrition is the first thing to think about both pre and postpartum,” he explains. “The second is postpartum interval — the reproductive tract must recover from calving in order for a cow to begin cycling.” Other influences on cycling include lactation, a cow’s age and breed, and calving difficulty.

Conception rate is affected by fertility of both the cow and bull, artificial insemination (AI) technique and semen, reproductive diseases, and nutrition. Especially in young females, nutrition can’t be overlooked because it’s an important factor in getting first-calf heifers to breed back, directly affecting body condition score (BCS) and reproductive performance (see Chart 1).

“Maintaining body scores is the first building block,” Lathrop points out, to rebreeding first-calf heifers. The old thought of maintaining a lower BCS in order to get a smaller calf and less dystocia “has been proven not to be necessarily true,” he

says. As research summarized in Chart 1 reveals, dystocia score was constant for all BCSs (a 0 equaled no calving difficulty); however, the higher the BCS, the better the percent of heifers in heat and bred back.

“We know that cattle do not get bred unless they cycle, and this chart shows that in order to cycle early after calving, the cattle must be at a certain level of BCS,” Lathrop summarizes.

Used as a management tool, BCSs measure levels of body reserves — or fleshiness — of cows. When collected regularly, this information can be useful for management and feeding decisions because it allows producers to keep tabs on the energy status of cows.

The beef BCS system ranges from 1-9, with 1 representing a very thin cow and 9 representing a very obese cow. BCS 4, 5 and 6 are the three most common BCSs. BCS 6 is known as ideal; BCS 5, moderate; and BCS 4, thin.



Measuring reproductive efficiency

Breeding and calving records, along with simple calculations, can supply a snapshot of a herd’s reproductive performance. These measures include:

- **Pregnancy rate** — the percent of cows pregnant divided by the total number of cows exposed.
- **Calving rate** — the percent of calves born divided by the total number of cows exposed.
- **Calf crop percentage** — the percent of calves weaned divided by the total number of cows exposed.

Other measurements Lathrop likes to use are median calving date; 21-, 42- and 62-day calving rates; and percent open or late cows.

In-herd figures such as these can be compared against benchmarks to see where a herd stands and where changes might need to be made. The gold standard of reproductive efficiency — which Lathrop refers

Chart 1: Body condition score and reproductive performance of first-calf heifers

	BCS 4	BCS 5	BCS 6
Body wt. at calving (lb.)	744	825	933
Calf birth wt. (lb.)	64	67	71
Dystocia score	1.2	1.2	1.2
% Showing heat			
20 days	42	54	63
40 days	56	80	98
60 days	74	90	98
% Bred back			
20 days	27	35	47
40 days	43	65	90
60 days	66	80	96

Spitzer et al., 1998

to as the “wish list” for cattle producers — is a high-efficiency or **70/100 herd** in which 100% of cows are cycling at the start of breeding season with a 70% conception rate. The median calving date — or date on which half of the calves are calved out — is day 16. As Chart 2 shows, 90% of calves are born within the first two cycles.

In a high-efficiency herd, more calves are born earlier in the calving season. This increases uniformity so that all calves can be marketed at one time. It also means heavier calves, which should translate into more pounds at weaning and thus more dollars, Lathrop points out.

In a medium-efficiency or **70/70 herd**, 70% of cows are cycling at the start of breeding season and 70% conceive. Eighty-five percent of the calves are born within the first two cycles, with half born by day 21 of calving season (see Chart 3).

Research conducted at Kansas State University shows that a median calving date of 5 days later costs \$26 per cow or \$2,600 per 100-head. Lathrop encourages producers to do the math. How much would one need to spend in order to get the herd up to the gold standard level? “The No. 1 reason why cows don’t cycle is nutrition,” Lathrop advises. “Perhaps there is an opportunity there to get the cows cycling.”

Another benchmark Lathrop gives is the high-efficiency problem or **50/100 herd** (see Chart 4). In this herd, nutrition is on par with 100% of cows cycling, but at only 50% conception isn’t where it should be. This points to problems with fertility or disease, he says.

“Semen testing bulls might be something you want to consider spending more money on,” Lathrop says. Studies show that about 20% of breeding bulls have reduced fertility. He points out that if a producer has used a given number of the same bulls for several years without changes or semen testing, the bulls may be underperforming, not able to get the cows bred when they should.

Another reason for underperformance is related to an unsuspected disease problem. In this scenario, studies show that pinpointing the problem can save \$65 per cow or \$6,500 in a 100-head herd.

One final example of herd performance is what’s known as the low-efficiency or **50/70 herd** in which 70% of cows are cycling and only 50% conceive (see Chart 5). Note that it’s day 30 before half the herd is calved out. Opportunity costs here are \$96 per cow or \$9,600 per 100 cows.

When cows aren’t cycling or conceiving, Lathrop says several factors need to be considered. “Nutrition could be a big one,” he says, such as trace mineral or protein problems. “Again, it might be a bull or vaccination problem or biosecurity issue.”

Using Chart 6 as a guide, Lathrop says producers can monitor percentages, while keeping in mind their own given production situation, and make changes based on what cost advantages may or may not be. He says if herds are lacking and action is needed, “there likely could be real

opportunity to make some money by improving reproductive performance.”

Maintaining pregnancy

In order to maintain pregnancy in cattle, again it takes good nutrition along with disease prevention, including a vaccination program and disease control (testing and segregation).

Reproductive diseases include the bacteria — brucellosis, vibriosis (campylobacter) and leptospirosis; the virals — IBR and BVD; and the protozoas — neospora and trichomoniasis. In diseases such as these, it’s often what you don’t see, such as early embryonic death and abortion, or what you do see, such as open cows or late calves, which hurt herd performance.

Lathrop points out that a cow’s antibodies do not pass the placental barrier, but pathogens such as viruses and bacteria can. Therefore, the cow needs a high level of protective immunity to prevent pathogens from reaching her fetus. Vaccine products that are marked with fetal protection — FP — have proven to protect the cow as well as the fetus from infections, such as BVD and IBR.

In order to protect a cow and unborn calf from disease, however, cattle need to be vaccinated, preferably prebreeding. Lathrop shares that vaccines, oftentimes, aren’t even given, especially in smaller herds, and are often misused or misunderstood.

“To get cows to cycle, nutrition is the first thing to think about both pre and postpartum.” — Mike Lathrop, DVM

For example, all killed vaccines must be boosted to carry out a high level of protection from disease challenge. “If the label says to booster, you need to do that for it to be effective,” Lathrop says. Modified-live virus vaccines offer longer lasting effects and a higher protective level with just one shot.

This veterinarian also stresses that the vaccine represents just half of the pie because a functional immune system is also critical for successful vaccination. “Just because you poke cattle with a needle doesn’t mean they’re immunized. Vaccinate healthy cattle on good days — instead of on stressful days — so they have a better chance to stimulate an immune response,” Lathrop advises.

He also recommends that producers be well aware of biosecurity issues, especially when commingling cattle. Commingling is an often overlooked critical factor in cattle movement that affects disease status, Lathrop says, and BVD is especially critical because it spreads through contact.

BVD can cause reproductive, respiratory or digestive tract ailments, and can be detrimental to the immune system. The primary source of the disease in a cow-calf operation is persistently infected (PI) cattle that contract the disease from their dams *in utero* during the first part of gestation, from about 45-150 days. If the infected fetus (PI) lives to full term, the calf will continually shed large numbers of the BVD virus for its entire life, even if vaccinated.

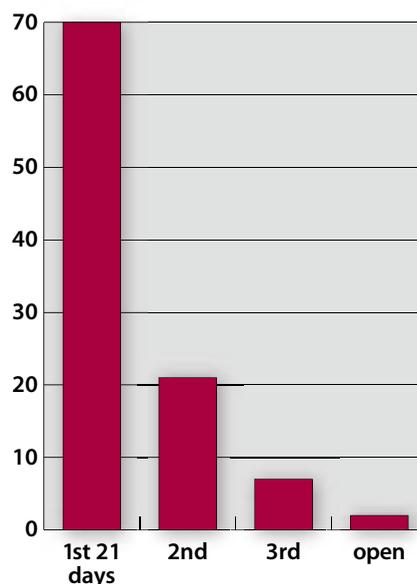
PI animals have the potential to spread the virus to all cattle they are

in contact with, either in-herd or when exposed to other animals through fence-line contact or commingling. Additionally, a PI female will always produce a PI calf, and affected bulls can transmit the disease through semen.

Records can help producers figure out where their herds stand reproductively, and if diseases such

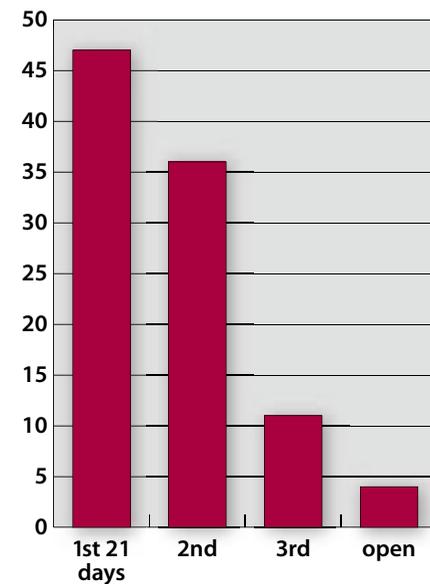
as BVD are taking a bite out of reproductive performance. Lathrop assures that good nutrition and good management programs for heifer development, natural and/or artificial service, vaccination, and disease control are all pieces that fit together to achieve herd reproductive success. **HW**

Chart 2: High-efficiency herd — 70/100



- 100% cycling at start of breeding season
- 70% conception rate
- Median calving date: Day 16

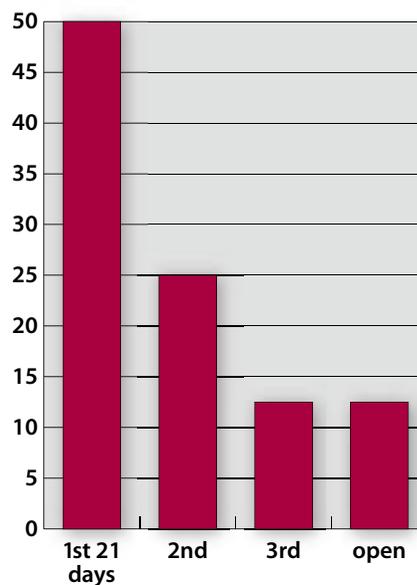
Chart 3: Medium-efficiency herd — 70/70



- 70% cycling
- 70% conception rate
- Median calving date: Day 21
- Cost \$26/cow
 - \$2,600/100 head herd
 - What would it cost to get this herd to 70/100?
- Nutrition?

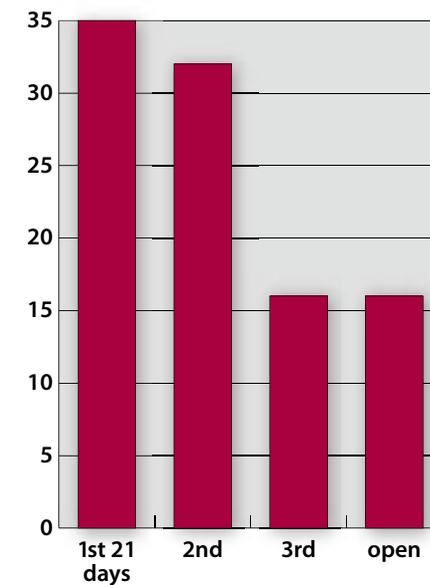
Spitzer et al., 2003

Chart 4: High-efficiency, problem herd — 50/100



- 100% cycling
- 50% conception rate
- Median calving date: Day 21
- Cost \$65/cow
 - \$6,500/100 head herd
- Fertility problems?
 - Semen test bulls
- Disease?
 - Vaccine

Chart 5: Low-efficiency herd — 50/70



- 70% cycling
- 50% conception rate
- Median calving date: Day 30
- Cost \$96/cow
- Nutrition?
- Fertility?
- Vaccination?
- Biosecurity issue?

Spitzer et al., 2003

Chart 6: Cow-calf production evaluators: Reproduction

	Goal	Monitor	Action
Calf crop %	>90	85-90	<85
60 day pregnancy rates (%)	>95	90-95	<90
1st 21 day pregnancy rates (%)	>65	55-60	<50
Median calving date	<17	18-25	>25