

Reproductive Performance in Replacement Heifers Has Long-Term Consequences on the Cow Herd

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Introduction

Everyone wants good cows! These are females that wean a calf annually throughout their lifetime. A cow's ability to do this depends heavily on her performance as a heifer. Thus, good heifers, make for good cows. There is no question that selecting the right heifers, rearing them properly, and getting them bred early in their first breeding season has long-term positive impacts on herd production and profitability.

A Fertile Heifer Will Be A Fertile Cow

Fertile heifers are defined as those that get pregnant early in their first breeding season. Heifers with the best chance of doing this are those that are born in the first 60 days of the calving season. These heifers are excellent prospects for replacement females because they are the oldest and more chronologically advanced toward puberty compared to their younger herd mates.

In order to reach puberty and breed at 15 months of age (and calve at two years of age), a heifer must achieve a target weight that is 65-70% of her expected mature weight before the start of first breeding. It is especially important that she reach this weight and start cycling before the start of breeding because the first puberal estrus (heat) is less fertile than subsequent heat periods that she will have during breeding. Certainly, those more fertile heat periods are critical to achieving good pregnancy rates. Providing adequate nutrition will allow the heifers a better chance to reach their target weight which will vary among breeds and between different herds. Such management will increase pregnancy rates in replacement heifers.

Heifers that fail to become pregnant should be culled. Research in 8 herds of open heifers (Table 1 - 778 head) that were held over for six months after first breeding for a second exposure to the bulls shows average pregnancy rates of only 58%. Among the eight herds, one had especially young females in the group that were not cycling at first breeding. Holding them for 6 more months allowed them to reach puberty and finally achieve pregnancy rates of 98%. That translates to a 12.5% chance of achieving pregnancy rates above 90% in open heifers held over for a second chance. The remaining seven herds had pregnancy rates ranging from 32% to 63%. Furthermore, in open heifers held over for a second chance, the cost per pregnancy achieved was twice the cost per pregnancy in those that conceived during the first attempt at breeding.

Early Conceivers Will Be More Productive and Profitable Throughout Life

The importance of early conception during the first breeding season for heifers and how it affects long-term production and profitability is shown in table 2. These data were taken from five Texas herds of commercial cows with over 1,500 calving events and compare the lifetime level of production, cost of production, and profitability in females that, as heifers, conceived and subsequently calved by various time intervals during their first calving season. For analysis purposes, cows were classed based on the date of their first calving as a two-year-old heifer.

Cow ages ranged from 3 to 16 years. Table 2 shows that average lifetime calf weight is highest in females whose first calving date as a heifer occurred during the first 21 days of calving (exception - herd 4 had only 2 cows in the early category). Table 2 also shows that the earliest calving females produced a pound of calf at the lowest lifetime break even cost. Because of lowest cost and highest production, females in all five herds that calved early as a two-year-old created the highest lifetime return on investment. The return on investment was calculated using the actual number of cows in each calving group and the actual number of calves generated from each calving group. Weights on all calves were taken when calves were 210 to 240 days of age. This narrow time window reduced any affect that calf age could have had on the data.

Herds 1, 2 and 3 used winter annual forages, and it is interesting to note in these three herds that lifetime return on investment for cows in the last 21-day calving group was higher than for cows in the third 21-day group. This does not necessarily follow the expected trend of lower production in the latest calving group. The reason for this is unclear but potentially relates to the fact that the cows in the last 21-day group in herds 1, 2 and 3 were giving birth in mid-March, and by the time those calves began to depend on grass as a greater part of their diet (mid-June), they were receiving a very high quality diet of early-growth bermuda grass. To the contrary, by the time the calves born in the third 21-day period began depending on grass (mid-May), they would have been grazing on mature (or dead) winter annuals, a much lower quality diet. Research has shown that low diet quality in the initial period when calves begin to depend more on grazing (about 90 days of age) can negatively affect gut function, and hence growth rate, for up to 100 days. At that point, calves would be over six months old, essentially at a marketable age, with a lower than expected weight.

Herd 5 also used winter annuals and is especially interesting in that return on investment for cows in both the third and last 21-day calving groups was equal at 6%, but higher than cows in the second 21-day group at 2%. This certainly does not follow the expected trend of lower profitability in later calving cows. The reason for this apparent inconsistency was due to very unique circumstances that existed in this particular herd. Sixty-seven percent of the cows that were originally in the third and last 21-day groups, began conceiving and calving earlier as their productive life advanced. Over a five year period, the net advance in calving date for these particular cows averaged 60 days. This advance resulted in better timing of calf birth dates, so that the onset of high grazing quality was almost coincident with the period when calves began to depend more on grass as part of the diet.

There is a message in these data from herds 1, 2, 3, and 5. Try to time the birth of calves so that the onset of high quality grazing (whenever that might be) is coincident with the period when calves begin to depend more on grass as part of the diet. Again, calves begin to shift toward increased grass intake at about 90 days of age. The final message in the data from all five herds is that managing heifers so that they can conceive and subsequently calve in the first 21 days of their initial production year has a dramatic impact on their ability to be productive and consistently profitable females.

What is not shown in table 2 is that among all cows in the study, 97% of the females in these herds did not switch from one time of calving to another during their entire life, but instead calved within 15-20 days either side of their very first calving date as a heifer. Only 3% of all females (all were in herd 5) actually had a significant advance in subsequent calving dates during their life. Thus, the old saying, "If they start early, they stay early, and if they start late, they stay late", is essentially true.

Management of Heifers for Early Conception and Calving

The keys to achieving early conception and calving in heifers include at least these things.

1. When selecting replacement heifers, choose among those born in the first 60 days of calving. They are the oldest and easiest to manage for proper weight which dictates the onset of puberty.
2. Provide adequate nutrition from weaning to first breeding (15 months of age) to ensure that they reach at least 65-70% of their expected mature weight before breeding starts.
2. Give appropriate vaccines which protect against reproductive diseases and use internal parasite control (see your veterinarian).
3. Consider using estrous synchronization at first breeding to force heifers to cycle at least twice in the first 21 days of breeding (once at the time of synchrony, and again 21 days later for those not conceiving at synchrony).

Be sure to sell any heifer that does not conceive. Additionally, this study suggests that it is best to sell any heifer that conveys late (last 40 days of an 80 day breeding period). The problems associated with failure to conceive and late conception (which results in late calving) in heifers will have long-term negative effects on future production and profitability. Following these steps in heifer management on an annual basis will result in a set of mature cows that anybody would be proud to own. These steps obviously place a lot of pressure on heifers to perform. Those that can perform are, without question, very fertile, more productive and more profitable. Those that can not perform under these conditions are less fertile (maybe sterile), less productive, and less profitable. What kind of females do you want to own?

Table 1. Pregnancy Rates in Heifers Failing to Conceive at First Breeding (14 to 15 Months of Age) and Held Over for a Second Breeding Six Months Later

Number	Breed	Pregnancy Rate at Second Breeding	Year
160	Hereford	53%	1975
64	Hereford	56%	1975
79	Brangus cross	98%	1996
92	Brangus cross	47%	1997
145	Brangus cross	54%	1998
43	Brangus cross	63%	1999
71	Brangus cross	61%	1999
124	3/4 to full Brahman	32%	1999

Total of 778 heifers that averaged 58% pregnancy rate (Spratt, 2001)

Table 2. Lifetime Average Calf Weight per Female as Affected by Date of Calving as a Two-Year-Old

Period (by 21 day intervals) of Calving as a two-year-old

	First 21 days	Second 21 days	Third 21 days	Last 21 days
Herd 1	556 lbs	535 lbs	494 lbs	523 lbs
Herd 2	499 lbs	452 lbs	424 lbs	429 lbs
Herd 3	519 lbs	475 lbs	430 lbs	423 lbs
Herd 4	507 lbs	517 lbs	492 lbs	474 lbs
Herd 5	499 lbs	468 lbs	459 lbs	475 lbs

Lifetime Average Cost to Produce a Pound of Calf

Herd 1	\$0.47	\$0.51	\$0.55	\$0.52
Herd 2	\$0.55	\$0.60	\$0.64	\$0.63
Herd 3	\$0.52	\$0.63	\$0.66	\$0.64
Herd 4	\$0.53	\$0.53	\$0.55	\$0.57
Herd 5	\$0.54	\$0.58	\$0.59	\$0.57

Lifetime Average Return on Investment per Female

Herd 1	14.8%	10.4%	4.7%	8.6%
Herd 2	(-3.2%)	(-10.3%)	(-12.4%)	(-11.2%)
Herd 3	9%	(-13%)	(-16%)	(-9%)
Herd 4	18%	9%	3.6%	(-10%)
Herd 5	14.7%	2%	6%	6%

Data taken from five herds of commercial cows and includes approximately 1,500 calves from females that calved annually throughout their life.

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