

LOW COST COW/CALF PROGRAM

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Heritability of Fertility

I hear/read that fertility in cattle is given a low-heritability rating. I know very little about genetics. I took a 3-credit hour course as a freshman but that didn't get much beyond bbBB. Watson and Crick didn't travel to Stockholm until well after I had completed my formal education. Genetics has never been my bag, so to speak. Therefore, when I read a report out of such a prestigious institution as the USDA at Clay Center, NE,¹ I know that I will be exposed to new facts. I only hope that I comprehend the material and put it to good use. In this paper, the researchers point to the difficulties of quantifying a genetic component for fertility because of the many, varied environmental influences (and phenotypic characteristics) that impact fertility. The Low Cost Cow/Calf Program is rife with the non-genetic influences on conception. We emphasize the positive role of photoperiod in this regard. First is the often-observed, though seldom-reported, peak in sexual activity of the herd around the time of the equinoxes. In the northern hemisphere, interest is mostly in the autumnal equinox (in the wee hours of the morning of Sep 23, this year). If a cow got pregnant on Sep 23, then (using a 280-day gestation period) she will calve June 30. That is about as close to the longest day of the year as you can get. That brings us to the second component of photoperiod, on which we focus: The cow that calves closest to the longest day of the year is more likely to rebreed than the cow calving closest to the shortest day of the year. Thus, our emphasis on summer calving. It has been our belief that increased fertility with summer calving is (at least in part) due to the shorter postpartum interval (PPI), allowing for multiple estrus cycles prior to bull visitation. These Clay Center researchers do not agree. They found that cows were just as likely to conceive whether it be there first, second, third or fourth postpartum cycle. Conception rates,

relative to the number of cycles prior to breeding, are shown in the following table.

No. of Cycles	Preg. Rate	Julian day Concep.
0	75.7	170.8
1	75.7	169.3
2	74.5	171.7
3	79.9	172.1

These differences are not statistically different. It is suggested that their opinion (of cows cycling well in advance of breeding, thus resulting in improved conception) came from studies with dairy breeds.

Summer Calving?

The cows used in this study commenced calving early February and were all through by about May 25. As the days grew longer, the PPI grew shorter. BCS scores were made at the start of the breeding season. *If scoring was done at the time of calving, it was not reported.* As BCS increased, PPI was lessened and more estrus cycles were observed. Low BCS at the start of the breeding season, however, did not reduce conception rates. In The Low Cost Cow/Calf Program, we emphasize the importance of BCS at the time of calving, which may or may not be directly related to BCS at the time of breeding. It must be said, however, that generally the two are closely related. In fact, we go so far as to employ a series of equations that combine photoperiod and BCS at the time of calving – in order to predict conception rate 85 days after the first calf is born. The prediction is based on the length of the calculated PPI and the subsequent number of estrus cycles by the 85th day postpartum. At the School, we provide each student with a sheet - showing the probability of conception (when calving at various times of the year at the ranch's location: latitude/day length) and the BCS of the cows. Further, for our consulting clients, we project (months in advance) the BCS at the time of calving; from that, we project the probability of conception. We arrive at these conclusions using the energy content of the forage (laboratory analyses). The purpose is to forewarn the rancher if difficulties loom ahead, while there is still adequate time to make adjustments. We admit

that the projections are not absolutely infallible. After all, this is 'biology speak.' The response received from alumni and clients, however, indicates that the projections are sufficiently accurate and do provide useful information. Of course, not all alumni get back to us about the projections. If the data (generated by our calculations) does not work for them, they just may be too polite to be critical. *Not a common attribute of independent-thinking ranchers.*

Stay The Course

Summer calving results in timely rebreeding. Apparently, this is not the result of shorter PPI and multiple cycles, *per se*, prior to breeding. They may, however, be indicators of deeper (less easily observed) physiological events that do impact postpartum conception. The authors of this paper suggest that the improved fertility (resulting from shorter PPI) "may be more due to positive, seasonal effects of day length and nutrient level on the reproductive axis than to increased cycle numbers." The cows in this study were fed, ad libitum, a diet consisting of 70% corn silage and 30% alfalfa haylage - as soon after calving as possible. That is not exactly starvation city. Could this possibly have masked the impact of multiple prebreeding estrus cycles on conception rate? I certainly don't know. This report is the first I have seen that disavows the idea of any benefit from multiple cycles prebreeding. Hopefully, additional studies (similar to this one) will clarify or refute the data reported. In the meantime, our recommendations appear to be working, albeit for all the wrong reasons. We will not apply a fix to our program until it becomes obviously broken.

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¹ Cushman, RA, MF Allan, RM Thallman and LV Cundiff. 2007. Characterization of biological types of cattle (Cycle VII): Influence of postpartum interval and estrous cycle length on fertility. J Anim. Sci 85:2156.