

## Effect of Prenatal Nutrition on Subsequent Cow and Calf Performance

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Some cattle producers have the impression that they can starve a profit into a cattle herd. In other words, going the cheap route is the most profitable for them. The question becomes, "Can cattle producers afford to underfeed the cow herd?"

There may not be an absolute correct answer to this question. Some considerations would be the general condition of the cows coming into the calving season, weather or environmental stresses, and general management skills of the cattle producer. The goal of the producer would be to have a cow produce a calf each year with high vigor, able to survive the elements, and to grow to desired weaning weight. Included in this goal is a cow and calf with disease resistance and a cow able to breed and conceive early in the breeding season.

Undernutrition of the pre- and postpartum cow has a deleterious effect on cow rebreeding and calf performance. Gilbert in a review article in 1942 reported that the principal factor in nutritionally related rebreeding problems was general undernutrition due to feed shortage or poor-quality feed. Since that time numerous studies report that undernutrition extends the anestrus period from calving to the first postpartum estrus. A more recent review article by Ronald Randel from Texas A&M in 1990 reported on research where inadequate energy or protein diets during pre- and (or) postcalving lowered pregnancy rates, first-service conception rates, and extended postpartum intervals in suckled postpartum beef females. Therefore, over the last 50 years the evidence is that cattle are what they eat (e.g., nutrition affects reproduction).

### **Cow Condition Score or Cow Target Weight**

A starting point of a good nutritional program is to evaluate cow condition in the herd at least 90 days before calving and at various intervals thereafter. Many researchers report that body condition scores are useful indicators of cow energy status and rebreeding performance (see CL720).

Overnourished/fat cows can be a problem just like malnourished/thin cows. Pregnant cattle need to be in moderate to good condition (body condition scores of 6-7 on a 9-point system (Houghton et al. 1990). Using the ideal target weight(s) or condition score(s) at calving allows for adequate body reserves of nutrients related to return of estrus and high conception rates at breeding time. This 90-day period before calving season would allow for modifications in feeding programs to reduce or eliminate postcalving anestrus and calf survival problems.

### **When Condition Scores are Low**

Many research studies have focused on the relationship between cow reproduction and energy consumption during both pre- and postpartum periods. Randel (1990) summarized six studies where pregnancy rate was related to adequate or inadequate energy during either the precalving or postcalving periods. He concluded that inadequate energy intake during late pregnancy lowers pregnancy rates even when energy intake is adequate during the postcalving season. If the lactat-

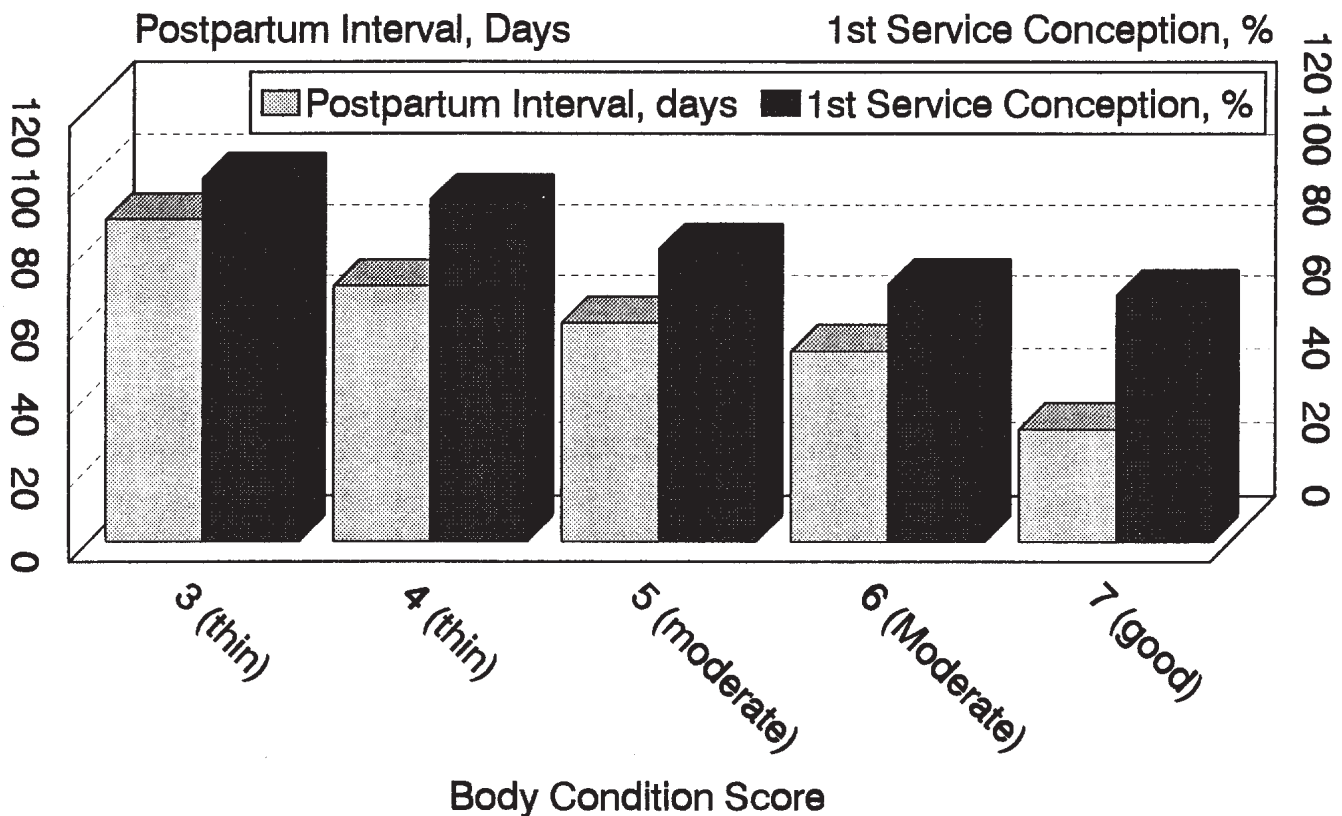


Fig. 1. Effect of body condition score at parturition and breeding on postpartum interval and conception at first service, respectively (Houghton 1990).

ing beef cows or heifers consumed inadequate energy during the postcalving period, a further decline in pregnancy rate occurred. In general, prepartum nutrition, especially body weight changes between 2 and 4 months before parturition, has the greatest influence on the cow's return to estrus and conception rates after calving.

These findings have been widely interpreted to mean that body condition of the beef cow at calving and breeding times is important in predicting the reproductive performance of the beef cow. As shown in Fig. 1, the body condition score at parturition had a direct influence on the interval between calving to first estrus. As the condition score of the cows at calving increased, the time interval to first estrus decreased. Thin cows at calving that lose condition and fat cows that gain condition exhibited lower pregnancy rates than cows in moderate condition or cows improved to moderate condition during the postpartum period (Houghton et al. 1990). This concept is supported by the research of Selk et al. (1988).

They also noted that cow body condition scores between 4 and 6 at parturition had a greater impact per unit of change on return to estrus and conception rates than cows that were thinner or fatter (Fig. 2). Moderate conditioned cows at breeding will have the highest pregnancy rate, but the postpartum interval will be influenced by the calving time condition score.

As shown in Fig. 1, thin cows may have a high conception rate, but they require a longer postpartum

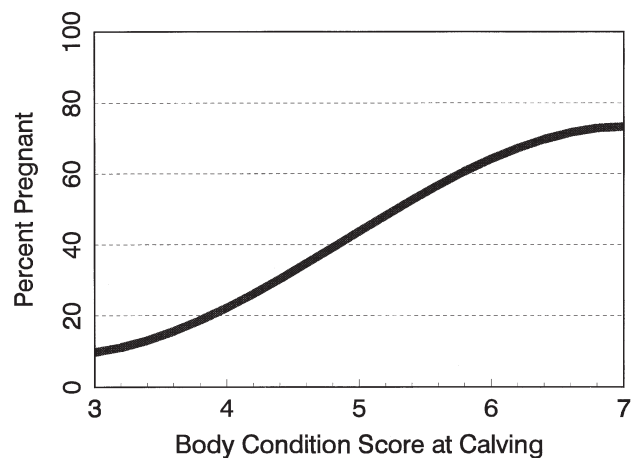


Fig. 2. Influence of precalving body condition scores on pregnancy rate (Selk et al. 1988).

interval than moderate conditioned cows. Dunn and Kaltenbach (1980) developed a regression equation relating energy status as expressed by body weight changes, using published data from other research reports. In this report, 91 percent of the multiparous and 64 percent of the primiparous cows would be predicted to be in estrus 60 days after parturition if there was no prepartum weight loss. Altered precalving body condition will influence subsequent pregnancy rate of beef cows. Selk et al. (1988) reported body condition scores before parturition and at the start of breeding season were the dominant factors influencing subsequent preg-

nancy rates. Cows with similar body condition scores may differ in rebreeding performance because of body weight or body condition changes during mid-gestation.

## Differences in Nutrition for Heifers vs. Mature Cows

Most cattle producers manage their replacement heifers to calve as 2-year-olds. The majority of the reproductive problems within a herd occur in these younger cattle. It's easy to understand the extra demands placed upon these younger females. Not only are they providing nutrients for the developing fetus, but they are still in the process of new tissue growth for their own bodies. When energy, protein, or other essential nutrients are deficient or marginal, these younger cows are the first ones to exhibit reproductive problems. Calving heifers as 2-year-olds requires adequate body condition.

Body condition at calving is the most reliable indicator of postpartum reproductive performance for this first calf cow. Such pregnant heifers should be managed to attain a body condition score of at least 6 at calving (DeRouen et al. 1994). Lower pregnancy rates and longer postpartum intervals are exhibited in cows having a body condition score of 5 than those with condition score of 6 or less at calving.

### Managing Heifer with Less Than 6 Condition Score

Although it is not recommended to calve heifers with less than the ideal condition score, it frequently occurs in the industry. This requires breeding replacement heifers to calve 30 to 45 days before the calving season of the mature cow herd. This allows for an extra time interval between calving and breeding season for these first-calf cows to return to estrus. This allows them to conceive early in the breeding season.

Often times, cattle producers do not adjust for this extra time interval between calving and breeding of the first-calf cows. Many of these young cows are delayed in rebreeding until late in the breeding season. This results in a younger calf that weighs less at weaning. This often results in the cow being culled because of low weaning weight.

This occurrence is not a fault of the cow for producing a calf because of being bred late in the breeding season. It is rather a fault of the cattle producer's management of the nutrition of bred heifer(s) at pre- and postpartum periods. Open or late to calve with the second calf is usually caused by inadequate pre- and postpartum nutrition of the heifer, which is usually caused by improper management of the cattle herd.

For the best reproduction, manage the young first and second calf separately from the mature cow herd. A higher plane of nutrition (energy and protein) is required for the younger cow. If the whole herd were fed for the needs of the younger cow, then the mature cows would be overfed and it would cost the cattle producer to maintain such a high energy level for these mature cows. Vary the energy consumption to the targeted body condition score of 6 or 7 at calving. Thin females need to reach this targeted body condition score during the last third of gestation, while those heifers in moderate to high body condition at 90 days prepartum should be fed levels to maintain body condition.

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