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REPRODUCTIVE PERFORMANCE OF THE BEEF COW: NUTRITION EFFECTS

R. J. Raleigh and Larry Foster
Squaw Butte Experiment Station 1/
Burns, Oregon

The literature indicates that the nutrient requirements of the beef brood cow, with respect to reproductive efficiency are not well established. Practical feeding and nutrition of the brood cow must be based on the feeding of low cost feedstuffs, usually range or low quality harvested forages. Most nutrients should go into maintenance requirements of the cow. Feed nutrients converted to calf gains via milk are inefficient. Consequently, for this symposia we will assume it is not economical to feed concentrate supplements for milk production. The nutritional requirements for reproduction will vary with types of management, location, and objectives.

The reproductive performance and milk production of beef cattle has been reported by many to be closely associated with nutritional status (Bond and Wiltbank, 1970; Ball et al, 1971; Hight, 1968; and Wiltbank et al, 1962). Most studies have shown that nutritional status will affect post-partum estrus interval, conception rate,pre-partum and post-partum weight changes of the cow and weaning weights of the calf.

Generally, inadequate levels of energy during gestation will delay first post-partum estrus; but, if adequate energy is provided after calving, conception rates should not be reduced. Hight (1968) and Wiltbank et al (1962) reported a 7 and 5% increase in conception rate, respectively, when cows were on a low plane of nutrition before and a high plane of nutrition after calving, compared to cows on a high plane of nutrition during both periods. Clanton, et al (1970) found that post-partum estrus interval was shortened with cattle on a level of nutrition to provide for gain before calving, but conception rates were highest in the group on the lowest plane of nutrition, a level provided to maintain weight, during this same period.

Loyacano, et al (1972) of Louisiana reported that a thirty day flushing period at 125 percent of NRC recommendations, just prior to the start of the breeding season increased conception rate over those animals on low quality pasture without supplements, but did not effect post-partum estrus interval. Bellows (1968) of Montana found that conception rate was not affected by supplemental feeding to cattle on crested wheatgrass range prior to, or during breeding, or during both periods, as compared to cattle receiving no supplementation. These cattle had been on a low plane of nutrition during the winter, had lost weight up to mid-May and were gaining in excess of two pounds per day after this time on crested wheatgrass forage alone.

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Raleigh and Wallace (1963) have shown that conception rates and dates of cattle wintered on 50% of the ad libitum intake of their paired mates were not significantly different. These cows gained back their lost weight by fall with both groups of cows coming off range at comparable weights. In a second study, Wallace and Raleigh (1964) fed 60 and 100% of the protein and energy levels recommended by NRC for wintering mature pregnant cows. Animals received energy and protein levels in balance and in other combinations of 20% above and 20% below NRC levels. Conception rates and dates were not affected by treatments.

Pinney et al (1962) in a study on lifetime performance of beef cows found that cattle maintained at a low plane of nutrition over their lifetime produced about 1 1/2 and 2 more calves, respectively, than cows maintained on a moderate or high plane of nutrition over their lifetime. Levels of nutrition were below, equal to, and above average NRC recommendations.

Most reported research discusses the nutritional requirements for reproduction and weaning weights synonymously (Ball et al, 1971; Bond and Wiltbank, 1970; Hight, 1968; and Raleigh and Wallace, 1963) but the nutrient requirements for individual production factors are not discussed. Nutrient requirements for various types of production should be treated separately. The economics of alternative feeding practices should also be considered.

In fall calving studies at this Station, Turner and Raleigh (1970) found that cows receiving energy levels at 70% of NRC recommendations lost more weight in the winter but conception rates and dates were not different from those receiving 100% of NRC recommendations. These cows calved in October and November, were bred in January and February, and had their calves weaned off in July. The objective of these studies was to determine the minimum nutrient requirement to insure annual conception, without regard for milk production; recognizing that it is more economical to provide feed directly to the calf than indirectly by feeding the cow to increase milk production. The study will continue for the lifetime of the animals but results to date have shown no adverse affect on rates and dates of conception from the lower level of feeding. Economics of calf production have favored the lower level of feeding.

The point to be brought out is that, from the practical side there is no clear-cut set of recommendations to be made. It depends on the objectives and resources of the producer and his ability to manipulate his management to capitalize on natural factors. In most cases, nature provides the tool that puts animals in the proper nutritional state for conception. Without man's manipulation you would have year round calving with a peak in March, April, and May in the northwest where grass starts to grow in April and May and provides a natural "flushing" for these animals to breed well. When man changes these practices, he must provide further management to achieve desirable conception rates and dates. In general, for normal conception animals should be on an increasing plane of nutrition either in the latter part of the pre-partum period, with some tolerable weight loss post-partum, or post-partum prior to and during breeding. Inadequate feeding during both of these periods can be disastrous and extra feeding, other than that which occurs naturally under range conditions can be costly unless the increased weaning weight of the calf can pay the feed bill. The feeding regimen of this cow should depend on the resources the producer has at his disposal. For the producer that has an abundance of high quality, low cost pasture, weaning a heavy calf will be economical. On the other hand the producer that has a large feed cost outlay in order for the cow to produce a heavy calf at weaning will not be in business long. His alternatives are to creep feed the calf or wean early and manage the calf separately.

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