

# Use of Performance Ratios to Calculate The Economic Impact of Thin Cows in Beef Cattle Herds

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Nutrition is the foundation of optimal livestock health and productivity. Veterinarians who provide consultation to beef herds make recommendations on nutrition programs to supply nutrients that meet animal requirements. Ranchers are often reluctant to implement recommendations to feed their cattle properly because feed costs are their greatest annual expense and they are uncertain of the economic outcome of increased feed costs vs improved herd performance. Many studies have been done on the reduced performance of cattle associated with poor body condition due to inadequate intakes of energy and/or protein. Thin cows are less productive than cows in good body condition due to: 1) lower pregnancy rates; 2) lower weaning weights of their calves; and 3) lower survivability of their calves.

Cows in good body condition are more productive than thin cows and academic clinicians urge beef cattle practitioners to make their clients aware of that in order to encourage implementation of better nutrition programs. "More productive", however, is a vague entity to livestock producers who may need to spend thousands of dollars to improve the nutrition program on a ranch. Many producers feel that they are wasting money if they feed enough to maintain cows in good body condition and some erroneously believe that lean cows perform the best. It is likely that ranchers would more readily carry out nutritional recommendations if they knew the value of the losses that result from thin cows in their herds.

The amount of income lost due to thin cows can be estimated from ranch data by performance ratios, a technique recently introduced by Dr. Larry Rice of Oklahoma State University.<sup>1</sup> The performance ratio is the production of thin cows expressed as a percentage of the production of cows in good body condition, within a herd. The methodology described in this paper is a modification and expansion of Rice's technique.

## Calculation of Performance Ratios

A 1 to 9 body condition score (BCS) classification is utilized.<sup>2</sup> The productivity of thin cows (BCS 3 group and BCS 4 group separately) is represented as a percentage (ratio) of the productivity of cows in good body condition (BCS 5 and BCS 6 group average). Although correlations of BCS to productivity are highest when BCS is recorded at calving or at the onset of the breeding season, the most convenient time to evaluate the BCS of every cow in a herd is at pregnancy examination.<sup>3,4</sup> Body condition at the time of pregnancy examination usually, but not always, correlates very well with productivity. We have found poor correlations (high pregnancy rates in cows with low BCSs at the time of pregnancy examination) in Longhorn cattle and in situations where moderate to severe weight loss has occurred following the breeding season due to drought or inadequate feeding of first lactation heifers.

The performance ratio of a thin cow group is the product of 4 performance parameters.

1. Cow pregnancy performance:  
Pregnancy rate of thin BCS group as a percent of the BCS 5 and 6 group average.
2. Calf weaning weight performance:  
Weaning weight of calves of thin BCS group as a percent of BCS 5 and 6 group average.
3. Calf survivability performance:  
Survivability of calves of thin BCS group as a percent of the BCS 5 and 6 group average.
4. Calf income per pound performance:  
Income per pound of calves of thin BCS group as a percent of BCS 5 and 6 group average.

For example, if the average pregnancy rate of cows in the BCS 5 and 6 group is 93% and the BCS 3 group

pregnancy rate is 56%, the pregnancy performance of the BCS 3 cows is .60 (.56 divided by .93). This must be multiplied by each of the other performance parameters to yield the overall performance ratio of the BCS 3 group. The first 3 performance parameters will be less than 1.0 for thin cow groups, but their calf price per pound performance is often greater than 1.0 because it is common for producers to receive a higher price per pound for smaller calves. Of all performance parameters, pregnancy performance generally has the greatest influence on overall performance ratios.

### Calculation of Lost Gross Income

The gross income lost in a herd from the lower production of thin cows is estimated by several steps. First the average income per cow in a group of 100 BCS 5 and 6 cows is determined. This baseline income (100% performance for income) is calculated from their pregnancy rate, calf loss rate, calf average weaning weight, and income per pound. The performance ratio of BCS 3 or 4 cows multiplied by the baseline income yields the income per BCS 3 or 4 cow. These values subtracted from the baseline income equals the income lost per BCS 3 or 4 cow. The loss per BCS 3 cow times the number of BCS 3 cows in the herd plus the loss per BCS 4 cow times the number of BCS 4 cows in the herd equals the total gross income lost by thin cows in the herd.

### Corrective Measure

The amount of gross income lost by thin cows in many beef herds is substantial. This presents an opportunity for veterinary practitioners to offer consultation that significantly increase the profits of their clients. Maintenance of good body condition requires proper

nutrition, adequate control of parasitism and prevention of debilitating infectious diseases, especially Johne's disease. The most common cause of thin cows is inadequate intake of energy.<sup>3</sup> The usual management measure to increase intake of energy involves grouping the pregnant BCS 3 and 4 cows at pregnancy examinations and feeding that group an appropriate energy/protein supplement and base diet that will increase their BCS to 5.5 by the time that they calve. Gains in muscle and fat of 210 pounds by BCS 3 cows and 126 pounds by BCS 4 cows plus 100 pounds of fetus, placenta, and fluids must be made for them to reach BCS 5.5.<sup>2,5</sup> Thus, it is important to pregnancy examine the herd by 100 days or more before the onset of calving so that adequate time is available for the thin cows to gain the required weight. The benefit:cost ratio of reconditioning thin pregnant cows is over 2 which indicates that this practice has a strong potential for improving the profitability of beef ranches. The use of performance ratios provide veterinarians who perform pregnancy examinations in beef herds an opportunity to consult on herd production and financial management practices.

### References

1. Rice, L.E. The effects of nutrition on reproductive performance of beef cattle. *Vet. Clin. N. Amer. -Food Animal Practice* 7: 1-26, 1991.
2. Herd, D.B., Spratt, L.R. Body condition nutrition and reproduction of beef cows. Texas Agricultural Extension Service, Bulletin B-1526, 1987.
3. Kunkle, W.E., Sand, R.S., Rae, D.O. Effect of body condition on productivity in beef cattle. In: *Factors Affecting Calf-Crop*, Fields, M.J. and Sand, R.S. (eds), CRC Press, Boca Ration, pp. 167-178, 1994.
4. Rae, D.O. Herd factors, parity, and body condition score of beef cattle: diagnostic adjuncts to pregnancy examination. *Compend. Cont. Educ.* 14: 256-262, 1992.
5. Wiltbank, J.N. Body condition scoring in beef cattle. In: Naylor, J.M. and Ralston, S.L., eds. *Large Animal Clinical Nutrition*. Baltimore: Mosby Year Book, pp. 169-178, 1991.