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## **Calf Weight As Percent Of Cow Weight Does Not Measure Efficiency**

In recent months statements such as, “a cow is expected to wean a calf that is close to 50% of her mature weight” seem to appear often in popular publications. Many times these statements have been stated as (and been accepted as) fact by many who should know better. In truth, while efficient cattle production has been researched for a long time, efficiency is remarkably misunderstood and seldom is real biological efficiency measured with any accuracy. And certainly any attempt at measuring true economic efficiency, which is the direct driver of profit at the ranch level, is never even mentioned. **Calf weight divided by cow weight reported as a percentage or a ratio does not measure efficiency in any manner.** To imply that it does is a tremendous disservice to cattlemen and selecting cows using this ratio will be costly for individual cow herds and the entire beef industry. Erroneously relying on that ratio to make important and expensive beef management decisions may lead to disastrous negative consequences in overall operational profitability.

All ratios of this type carry some bias and the calf weight/cow weight ratio is always biased in favor of smaller, heavier milking cows. Neither of which are always efficient in terms of converting grass to calf weaning weight and rebreeding on an annual basis. Shattering the “small cows are better” myth will have to await another article, but for now we know small cows are not inherently more biologically and certainly not more economically efficient; and increased milk production can have very detrimental effects on either measure of efficiency.

The most direct study of **calf weight as percent of cow weight does not measure efficiency** comes from a series of experiments published in the Journal of Animal Science and conducted at South Dakota State University by Dr. Chris Dinkel and coworkers in the late 1970s.

Angus, Charolais, Angus X Charolais and Charolais X Angus cows with weights ranging from 794 pounds to 1274 pounds were housed in drylot and individually fed every day of the year for three years. All calves were sired by the same Hereford bull within each year. Therefore the TRUE MEASURE OF EFFICIENCY was total feed (TDN) intake of the cow and her calf over the entire year compared to the actual weaning weight of the calf when weaned at approximately 7 months of age. That is simply how much total feed it took to produce a pound of calf in a year's time. Results indicated that calf weight/cow weight had little relationship to this actual measure of efficiency and that weaning weight by itself was the best single predictor of efficiency.

Further analysis of these data indicated a coefficient of 0.62 (fairly high for a biological coefficient) between calf weaning weight and feed required by the cow-calf unit to produce a pound of weaning weight. The coefficient between cow weight and efficiency was 0.003 or essentially zero. Quoting directly from Dinkel and Brown, J Anim Sci 1978, "Thus, it appears that the ratio (calf weight/cow weight) consists of a numerator (calf weight) with a reasonably high accuracy as a predictor of efficiency and a denominator (cow weight) with essentially no accuracy in predicting efficiency. One would expect *a priori* that the accuracy of prediction achieved by weaning weight alone could not be helped by dividing it by a variable with low relationship to efficiency."

The take home message is that the determination of calf weight as percent of calf weight is fundamentally wrong for many reasons. The only concretely measured variable therein is calf weaning weight. Blanket estimates of feed intake to support a certain size of cow are not accurate. Feed intake of the cow depends on breed, mature weight, body condition score, age, stage of production, milk production potential, quality and quantity of forage, individual energetic efficiency, environmental stress and other variables we are unable to identify or take

into account in a pasture or range situation. AND, none of that accounts for economic efficiency as affected by fixed costs per cow, fertility, early puberty and productive longevity. For now what we do know is the most efficient cow in your herd is the cow that weans the biggest calf and rebreeds to calve with an approximately yearly calving interval. Regardless of how much that individual cow weighs or what percent of her body weight her weaned calf weighs.

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