

BEEF PRODUCTION EFFICIENCY - PART 1

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Efficiency has been one of the major buzz words in the beef industry for the last few years being discussed at every level of the beef production chain. Many outstanding beef cattle researchers have delved into research relating in some way to measuring and defining efficiency of beef production, and most breed associations have made some attempt to include measures of efficiency in their suite of Expected Progeny Differences (EPD's) or Index values. Also, many seedstock producers promote bulls as being selected to improve some parameter of production efficiency.

In addressing beef production efficiency, discussion should begin with cow efficiency. Dr. Roy Burris did an excellent job of laying the basic groundwork relating to cow efficiency in his March Cow Country News article. Dr. Burris suggested that the long used ratio of calf weaning weight to cow weight was a good starting point to consider. He suggested a goal of 50% or greater with a calf of "high value". It is important to emphasize producing a "high value" feeder calf or a replacement heifer, and one of the main ways to get uniform calves of higher value is to get a large percentage of the calves born during the first 30 days of the calving season. Heifers born early in the calving season usually reach puberty and begin to cycle earlier than heifers born later in the calving season. Furthermore, heifers that become pregnant early in the breeding season and calve in the first one third of the calving season usually have much greater lifetime production compared to heifers that calve later in the season. So, the most important efficiency to emphasize for cow/calf producers is reproductive efficiency.

Producers should set reproductive goals for their farms and work toward achieving those goals. A realistic goal is a 60 to 75 day calving season with 70% of the calves being born during the first 30 days of the season. It is also realistic to expect greater than a 95% calf crop (calves weaned/cows exposed to the bull). Another goal should relate to longevity of production, and a realistic goal is for cows to calve regularly for 10 to 12 years. Most economic research shows longevity of production or cow stayability to be the greatest profit driver for cow/calf herds. Achieving these ambitious goals involves both genetics and the environmental factors of nutrition, herd health, and outstanding husbandry.

Now what do we know about the science of brood cow efficiency? We know clearly that as cow size increases the nutritional requirements for body maintenance increase. Maintenance requirements increase at the 0.7 power of body weight which means that an 1100 pound cow has a 7% greater requirement than a 1000 pound cow and a 1400



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pound cow would have a 28% greater requirement for maintenance than a 1000 pound cow. Dr. Gene Rouse, Professor Emeritus of Animal Science at Iowa State University shared that 70% of the feed or nutrient use in the US beef industry is for body maintenance and only 30% is actually used for production. Consequently, any time the maintenance requirement for cattle is reduced, there will likely be an improvement in efficiency. This concept applies to brood cows as well as for cattle in the stockering and finishing phases of production.

It should be clear that cows with more milk production potential have greater nutrient requirements during lactation, but researchers at the University of Nebraska and at the US Meat Animal Research Center have shown that cows with higher milk production potential also have higher maintenance requirements during the dry period as well. This is related to the fact that cows with greater milk production potential have greater visceral organ mass relative to empty body weight compared to cows with lower milk production potential. The rumen, small and large intestines, liver, heart, and kidneys tend to be larger in cows with more milk production potential. The gastro intestinal tract and liver make up only 10% of the cow's body mass, but combine to use 40 to 50% of total energy expenditure in a beef cow.

There is no argument about the need for an adequate level of high quality colostrum to provide antibody protection to the newborn calf. Also, an adequate supply of milk is necessary to provide nutrition to the calf until the calf becomes capable of grazing or consuming enough stored roughages for optimal



growth. Since genetic evaluation systems have included milk EPD's, many breeders have continually selected to increase milk production potential. The result is that many commercial cows today have very high milk production potential. So, how efficiently do calves convert milk to weight gain? Lewis and co-workers at the University of Nebraska compared the pounds of milk required per pound of calf gain for low, medium and high milk production cows and found the conversion ratio of milk to calf weight gain to be 11.6, 15.2 and 52.6 for the low, medium and high milk producing cows, respectively. These data indicate that calves are much less efficient in converting large volumes of milk to weight gain. Consequently, meeting the nutrient requirements of cows with high milk production potential may be a wasteful use of feedstuffs.

Another concern about cows with high milk production potential relates to what may happen if feed/forage supplies are limited such as in a drought year. Dr. Dave Lalman's work at Oklahoma State University shows that cows with high milk production potential may actually produce less milk than cows with lower milk production potential in situations where feed resources are restricted. The other net result for the cows with high milk production potential is that those cows are likely to be in a state of negative energy balance when feed resources are limited; thus, the likelihood of those cows becoming pregnant in a 60 to 75-day breeding season is reduced.

In summary, to realize optimal efficiency in the cow herd, it is of extreme importance to have cows that are adapted to the farm environment and that thrive and reproduce on the available forage resources of the farm. Identifying and producing or purchasing cows of optimal size and milk production potential for a particular farm is the ideal way to have an efficient cow/calf operation. There are many advantages to having a relatively short calving season with a high percentage of calves born during the first 30 days of the season. Efficiency in the growing and finishing phases of production will be discussed next month.

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Editors Note: Dr. Gordon Jones was a presenter at the 2015 ASA Fall Focus. This is part one of a series of articles that will appear in the ND Scene/SD SimmenTeller that were originally written for Cow Country News. Dr. Jones retired in 2010 as professor of animal science after 40 years on faculty at Western Kentucky University. Jones also served six years on the beef improvement committee of the Red Angus Association of America (RAAA) and is currently a member of the technical committee of RAAA. Dr. Jones and his family have been in the swine seedstock business for over 50 years and is currently involved with his family's operation – Red Hill Farms Red Angus & Simmental. He works with commercial producers in planning selection programs and crossbreeding systems.