# Consider Efficiency When Purchasing Bulls This Year


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Bull buying time is around the corner again and as usual there is someone telling you how to buy your bulls. Last fall I submitted an article suggesting that we should consider **Cow Mature Size** when selecting bulls. Cow size is an important characteristic because large cows of course require more feed resources. Conversely, although smaller cows require less feed, they may not produce a calf of adequate size and growth to satisfy the requirements of the feedlot and packing industries. Monitoring cow size is important. In this article I would like to address the subject of **Energetic Efficiency**. The importance of energetics is obvious since feed costs usually account for the majority of production costs and 80% of feed costs is usually associated with supplying needed energy.

To put it terms my Grandpa would use, efficiency is doing the same or more with less. There are two major categories of efficiency associate with the livestock industry: **Biological and Economic**, e.g., lbs. gain/lb. of feed or $/lb. of gain. Biological and economic efficiency are often but not always positively correlated.

In the feedlot rapidly growing cattle possess an inherent efficiency because they reach finish more quickly than slower growing cattle and more of the energy they consume is used for body tissue gain rather than body tissue maintenance. There are a couple of problems with his type of energy efficiency. First, heavy genetic selection pressure usually results in larger body sized cattle and second, this does not necessarily mean that these cattle are more efficient regarding feed energy utilization.

I would like to make a few comments on the **Physiological/Metabolic Efficiency** with which cattle utilize feed energy, i.e., digestion, absorption, metabolism. One advantage of genetic selecting for this type of efficiency is that it can be accomplished independent of body size.

I have spent many years measuring the nutrient utilization of cattle while in individual pens. The following example illustrates the differences in nutrient utilization of four dry, pregnant (70 days) beef cows. All were 6-year old half-sisters sired by the same bull and their mothers were also half-sisters. The diet was a low-quality hay (.48 Mcal NEm/lb. DM).

| Cow | DM Intake, lbs./d | Digestibility, % | Digestible DM (DDM) Intake, lbs./day | Weight change, lbs. (56 days) | lbs. of gain/ lb. of DDM |
|---|---|---|---|---|---|
| **187** | 25.2 | 51.3 | 12.92 | +30.7 | .0457 |
| **163** | 20.2 | 51.2 | 10.34 | +30.3 | .0564 |
| **158** | 20.5 | 48.1 | 9.86 | +17.5 | .0341 |
| **191** | 22.8 | 55.2 | 12.59 | +14.4 | .0220 |

The following are a few points that can be gleaned from the nutrient utilization of these closely related cows:

- Differences in Efficiency can be partially explained by differences in:
    1. Feed Intake
    2. Feed Digestibility
    3. Nutrient Utilization After Digestion.

- The Efficiency Metric in the table is **lbs. of gain/lb. of Digestible Dry Matter Intake**, which is a crude indicator of the efficiency of post-digestive nutrient utilization.
- **Cow 163** exhibits the characteristics of an **Energetically Efficient Cow**; low feed intake, high feed digestibility, efficient utilization of digested nutrients. **She Did More With Less**.
- Even though these cows were closely related genetically and were reared under the same management, there were differences in feed utilization and nutrient metabolism.
- **Where There Is Variation, There Are Opportunities For Selection.**

The implications of beef cow feed efficiency will affect factors like farm/ranch carrying capacity and therefore important biological/economic characteristics like revenue/acre. The following table illustrates the effects of a **10% Improvement in the Efficiency of Energy Utilization** in 1200 lb. beef cows on 100 acres of pasture:

| Item | 1200 lbs., average efficiency | 1200 lbs., high efficiency |
|---|---|---|
| **Annual farm forage production, lbs.** | 650000 | 650000 |
| **Yearly forage DM required/pair** | 13231 - (13231x.10) = | 11908 |
| **Farm carrying capacity, pairs/year** | **49** | **54** |
| **Calf weaning weight, lbs.** | 564 | 564 |
| **Calves weaned (@90%)** | 44 | 49 |
| **Total annual calf production, lbs.** | 24816 | 27636 |
| **Annual calf production/acre, lbs.** | **248.16** | **276.36** |
| **Estimated calf market value, $/lb.** | 1.61 | 1.61 |
| **Total annual calf revenue, $** | 39953.76 | 44493.96 |
| **Calf revenue/cow, $** | **815.38** | **823.96** |
| **Total annual calf revenue/acre, $** | **399.54** | **444.94** |


Due to the development of equipment such as that depicted, many breed associations now provide Expected Progeny Differences (EPDs) for the energetic efficiency of bulls in their sire summaries. For example **Relative Feed Intake (RFI)** is used by some breed associations. It is defined as the difference between an animals actual feed intake and its predicted feed intake based on animal size, daily gain, and body composition in comparison to contemporaries. A low RFI is good but a negative RFI is preferred because the animal consumed less feed than predicted. Other breed associations use **Residual Average Daily Gain (RADF),** which compares the predicted average daily gain of an animal with the actual daily gain based on a set amount of feed intake. When using RADF, larger numbers indicate more efficient animals because they gained more than would be predicted on a given amount of feed. Bull A below is the most energetically efficient and in addition will help moderate mature cow size in the herd.

| Sire | Calving Ease | Yearling Weight | Residual Average Daily Gain | Milk | Mature Weight |
|---|---|---|---|---|---|
| **A** | **+5** | **+39** | **+.40** | **+15** | **+5** |
| **B** | **+5** | **+40** | **-.10** | **+15** | **+28** |