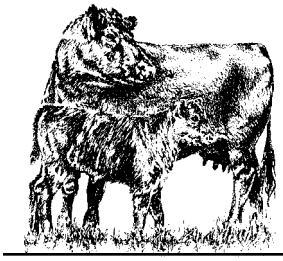

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Genetics Section 825

Selecting for Efficiency of Feed Utilization: Now and in the Future

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Feed is the largest variable cost on most cow-calf operations and the largest cost variable in the "profitability equation" over which a producer has control. Therefore, the ability to reduce feed intake (and, therefore, feed costs) without negatively affecting reproduction, growth, carcass performance, or meat quality is becoming a priority in beef cattle selection programs (Arthur et al. 1999).

Efforts to genetically improve the efficiency of feed utilization in beef cattle have been initiated only recently in the U.S. Over the past several decades, beef cattle breed associations have focused primarily on creating expected progeny differences (EPDs) for only growth and carcass traits, which are easily and inexpensively measured (Rumph 2005). Unfortunately, these traits tend to encourage the maximization of productivity by predicting characteristics only related to generating income. Just recently has attention been directed toward traits that relate to the costs associated with U.S. beef production, including feed efficiency.

Measuring Efficiency of Feed Use

Two major challenges are associated with the genetic prediction of feed utilization: (1) historical methods used to calculate feed efficiency are generally lacking, flawed, and/or unproven, and (2) collecting individual daily feed intake for cattle is expensive compared to other performance traits (e.g., body weight gain).

Historically, efficiency of feed utilization has been measured and reported primarily as a ratio, where the amount of feed required to produce a unit of gain was determined. It has been reported as either a feed-to-gain (F:G) ratio or a gain-to-feed (G:F) ratio. Thus, for an animal that consumes 8 pounds of feed (on a dry matter basis) and puts on 1 pound of body weight gain, its F:G would be 8.0 (8 lb ÷ 1 lb) while its G:F would be 0.125 (1 lb ÷ 8 lb).

Unfortunately, the use of these simple calculations ignores an animal's current body weight and rate of gain. As a result, selection for more desirable F:G inadvertently leads to animals that have a greater mature size since animals that have a greater rate of gain are also being selected, albeit inadvertently. Ultimately, the U.S. beef industry is in need of a method to measure feed efficiency that is independent of other performance traits including reproduction, growth, and carcass performance.

Another problem is that collecting individual daily feed intake on cattle is expensive. Currently, the only methods to collect intake data involve the use of costly individual Calan gates (www.americancalan.com), GrowSafe feeders (www.growsafe.com), or small pens that only hold one head. In addition, to effectively characterize weight gain over a "test" period, cattle need to be weighed at regular intervals (typically every 2 weeks) (Exton 2001).

Finally, in order to ensure uniformity across tests and testing locations, additional variables need to be consistent including ration composition (particularly energy level of the diet) and test duration. Therefore, the U.S. beef industry is in need of either an elaborate infrastructure of technology able to record individual feed intakes and weights during a uniform test period (such as central bull test stations), or accurate methods of predicting the efficiency of feed utilization through the analysis of tissue samples (e.g., blood hormone concentration), low cost gene markers, or correlated traits that can be easily measured (e.g., mature body weight at a constant body condition score).

Current Genetic Prediction for Feed Efficiency in the U.S.

Based on producer demands for a genetic prediction of feed efficiency, several breed associations have