

UF-Gainesville Beef Cattle News Corner

Selection and economically relevant traits

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The focus of sire selection should be on what is economical. But this requires a good understanding of what traits are important within a specific beef cattle enterprise – traits that directly influence either a cost of production or an income from production (either generate revenue or incur a cost). By focusing on economically relevant traits, sire selection can result in faster genetic improvement and improved profitability.

Sire selection does not have to be overwhelming or complex. The work of many geneticists and statisticians over the last few centuries have resulted in development of tools that help producers make decisions relative to the next bull you purchase; do not ignore them. There are however a few key questions that every rancher needs to answer:

- 1) What are my breeding/marketing goals?
- 2) Which traits directly impact the profitability of my enterprise?
- 3) Are there environmental constraints that dictate the level of performance that is acceptable for a given trait in my enterprise?

The answer to these questions leads the producer to the traits that are economically relevant to their enterprise – and that makes sire selection much simpler. Selection can occur based on the economically relevant trait itself or based on indicator traits when the trait itself is costly to measure or is measured after slaughter. Good indicator traits can be measured early in life, are easy to measure and have a high genetic correlation with the target trait. **Table 1** provides a suggested list of Economically Relevant Traits currently with available EPDs and their corresponding indicator traits.

Table 1. List of suggested Economically Relevant Traits and their corresponding indicator trait.

Economically Relevant Traits	Indicator trait
Calving ease	Birth weight
Weaning weight	Birth weight
Yearling weight	Yearling height, weaning weight
Heifer pregnancy	Scrotal circumference (<i>Bos Indicus</i> breeds)
Carcass weight	Yearling weight
Percent retail cuts (Yield Grade)	Fat thickness (12 th rib, Ribeye area)
Marbling Score (Quality Grade)	Intramuscular fat percentage
Tenderness (not relevant unless increased income received for more tender beef)	Marbling score, Intramuscular fat percentage
Dry matter intake	Yearling weight, residual feed intake

The best way to differentiate between economically relevant traits and indicator traits is to ask this question about the trait of interest—if this trait changes up or down one unit, with no changes in any other traits, will there be a direct effect on income or expense? Birth weight and calving ease provide a great example of the distinction between an economically relevant trait and an indicator trait. Does a 1 lb change in birth weight directly influence income or expense? Likely not, as that change may or may not result in increased/decreased calving difficulty. With calving ease, a 1% decrease (1 extra animal assisted for every 100 calvings) has a direct impact on profitability. Decreased calving ease results in higher labor costs, decreased calf survival (and fewer animals to sell) and delayed rebreeding for the cow resulting in younger and hence lighter calves at weaning the following year—all of which have a direct impact on profitability. Birth weight is an indicator of the economically relevant trait, calving ease.

In the list above many weight traits are listed as economically relevant traits but this depends on the marketing endpoint of a particular enterprise. For example, for a commercial producer marketing calves at weaning, weaning weight is the economically relevant trait. On the other hand, for a producer retaining ownership through the feedlot and selling on a grid, the economically relevant trait is carcass weight. Although from an industry perspective carcass weight is always the economically relevant trait, the individual producer goals might dictate alternate marketing endpoints and traits of emphasis. Tenderness is another example of a trait that is clearly an economically relevant trait from the perspective of the entire beef industry complex, but is one that does not provide a clear economic incentive to the individual producer.

By identifying the economically relevant traits, producers take the first step towards simplifying selection decisions by reducing the number of EPD to consider and focusing on improving performance in traits directly related to profitability. It is critical that commercial producers identify their breeding goals and thus the traits that are economically relevant to them. Selection pressure should be applied to the traits that directly impact profitability, and in the absence of EPD for these traits the corresponding indicator trait EPD should be used.