

THE DIGESTIVE TRACT

Optimize forage utilization with genetics, pasture management

by Dan Shike, University of Illinois



Cow-calf operations are predominately grazing-based systems. Success is dependent on

efficient utilization of forage by the cow. Given this paradigm, one would think there would be significant genetic selection for efficient forage utilization. Unfortunately, that is not really the case.

You would also think there would be substantial focus given to management practices that affect forage utilization. Although, I would say more attention has been given to the management side than to genetic selection, there is still plenty of room for improvement on many operations.

Genetic selection

To achieve a response to genetic selection, the trait must be measurable, have variation in the population, and be heritable. Heritability of intake in heifers has been reported to be in the range of 0.28 to 0.84. Very few studies have been done reporting the heritability of intake in cows, but those that have report heritability estimates of 0.28 to 0.53. This would suggest intake is moderately heritable.

The challenge is that intake, especially grazing forage intake, is difficult to measure. Individual feed intake monitoring equipment, such as GrowSafe® and SmartFeed, has gained popularity and allows for universities and producers to collect individual intake data on large groups of cattle.

If intake is measurable, there is variation in the population and it is a heritable trait, we will see a response to genetic selection. The question now becomes, do we select for more or less intake?

At the University of Illinois, we have been collecting intake data for more than 15 years. While the majority of the intake data we have collected has been on growing and finishing steers fed a concentrate diet, we have measured forage intake on females, as well.

We have routinely conducted an intake evaluation on our replacement heifers, and we have reevaluated many of the females again as 2-year-old and 5-year-old cows. We have found there is a moderate phenotypic correlation

(0.55) between developing heifers and mature cows for forage intake.

In a recent *Journal of Animal Science* publication, Freetly and co-workers (2020) reported a genetic correlation between heifer and cow intake of 0.84. That data set from the U.S. Meat Animal Research Center (USMARC) represents one of the largest (+600 cows) to be evaluated. While that correlation is very encouraging, we still need to continue to collect and analyze more data.

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What does this correlation mean? It means that if we select for intake in heifers, we will see the same response in cows. This is huge, because we currently have the ability to collect intake data on significantly more growing heifers than we do mature cows.

More or less?

So, if intake is measurable, there is variation in the population and it is a heritable trait, we will see a response to genetic selection. The question now becomes, do we select for more or less intake? This question is certain to spark a lively discussion amongst academics and producers alike.

The challenge is that intake is correlated to desirable output traits (growth). We want to select efficient animals that have a desirable relationship between input (feed) and output (growth/carcass/repro) traits.

Selection indexes put an economic value on multiple traits

and allow for selection based on profit potential. Interestingly, if you look at the top 15% for beef value (\$B) and maternal value (\$M) in the Angus database, most of the bulls will also be at the very high end for intake.

As feed prices have recently seen a dramatic increase, there could be some shifting in the leaders for \$Values, and it may favor some of the lower-intake, more moderate production cattle.

I do not think there is necessarily a “right” answer for the question of whether we should be selecting for more or less intake. However, we need to be aware of the genetics we are using, and realize that if we have stacked in a few generations of high-intake cattle, we may need to manage our cow herd accordingly.

Manage forage

Management of forage resources is key to maximizing genetic potential of your cow herd. What does this look like? Grazing

Forage resources are the backbone of the cow-calf industry and must be managed in a way to optimize annual output and sustained production.

management practices vary according to forage species, season, precipitation and cattle requirements. Rotational grazing, stockpiling, weed management, and allowing for proper rest and regrowth are all important management practices.

Overgrazing due to improper stocking rates or drought can cause significant damage to pasture that will take years to recover.

Soil sampling and testing for soil fertility is a key step to ensuring you are maximizing forage production. Sampling pasture and hay is essential for determining if supplementation is needed. Although soil and forage sampling do take time and have some associated costs, the benefits will outweigh the costs.

To wrap up

Cow-calf producers continue to seek genetics that will position their cow herds for profit and sustainable production. Identifying and selecting for cattle that are efficient utilizers of forage is key to future success.

However, genetics alone will not guarantee success. Forage resources are the backbone of the cow-calf industry and must be managed in a way to optimize annual output and sustained production. |

Editor's note: "The Digestive Tract" is a regular column in the *Angus Beef Bulletin* focused on nutrition for the beef cattle life cycle. Dan Shike is associate professor in animal sciences at the University of Illinois.