Hair Shedding Scores:
A Tool to Select Heat-Tolerant Cattle

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Responsible beef breeding requires matching cattle genetics to the production environment. This is necessary for at least three reasons: profitability, animal well-being, and improved environmental impact. Cattle that are well-suited to their environment are more profitable. Not only are well-adapted cattle more productive, but they also require fewer inputs and management interventions. It is estimated that cattle suffering from fescue toxicosis and heat stress cost the beef industry over a billion dollars a year.

Cattle that are adapted to their environment suffer less stress. This improves the animal's well-being, which is important to cattle producers, beef consumers, and society. One of the greatest environmental challenges for beef producers in many parts of the U.S. is heat stress. This is especially true in the Southeast where relatively high humidity levels, compounded with endophyte infected fescue, intensify hot temperatures with which cattle must cope to remain comfortable and productive.

Cattle whose genetics better match their environment are more effective at utilizing resources. Typical indications of cattle whose genetics do not match their environment are decreased calf weaning weights and/or failure to rebreed.

By improving the efficiency of the cow, the overall efficiency of natural resource use for beef cattle production is improved. Therefore, selecting cattle that appropriately cope with heat stress is a major piece of sustainable beef production.

What tools are available to breed cattle adapted to heat stress?

One time-tested solution to produce cattle adapted to heat is to introduce genetics from cattle that are adapted to tropical or subtropical conditions. This includes *Bos indicus* ("eared" cattle e.g., Brahman, Nelore), *Bos indicus* hybrids (e.g., Brangus, Beefmaster, Santa Gertrudis, Braford, Simbrah), or other breeds selected for heat tolerance (e.g., Senepol, Romosinuano, Barzona) into a herd. *Bos indicus*-influenced cattle have advantages (anatomical and physiological) that make them better equipped to deal with heat stress. Farmers and ranchers must also consider performance levels and marketability of their cattle when deciding to what extent to utilize *Bos indicus*-influenced cattle or other tropically adapted breeds in breeding programs. An alternative approach is to select cattle better adapted to heat stress from more commonly used British and Continental breeds. This is likely an optimal strategy in more temperate regions.

The amount of the winter coat shed by a set date during spring or summer is an effective predictor of a cow's ability to cope with heat stress. Earlier shedding can be an indication of improved productivity and adaptation to the production environment. Hair shedding likely has a direct effect on heat loss; however, it is also an indicator of other factors (e.g., nutrition or immune status). Early research into hair shedding indicated large portions of the variation was due to genetic differences (high heritability estimate, $h^2 = 0.63$). In this early research, a strong genetic relationship between hair shedding and growth rate was observed in British cattle (but not detected in Brahman cattle). More recent estimates of hair shedding score heritability are moderate (h2 = 0.35 to 0.42) but represent opportunities for further genetic improvement. In hot and humid environments, cows that shed their winter coat earlier tend to wean calves with heavier weaning weights, with some estimates between cattle that shed the earliest and those that shed the latest as large as 50 pounds. Cattle with enhanced ability to shed hair may also have improved tolerance to toxic fescue, as retained winter hair is a common symptom of fescue toxicosis.
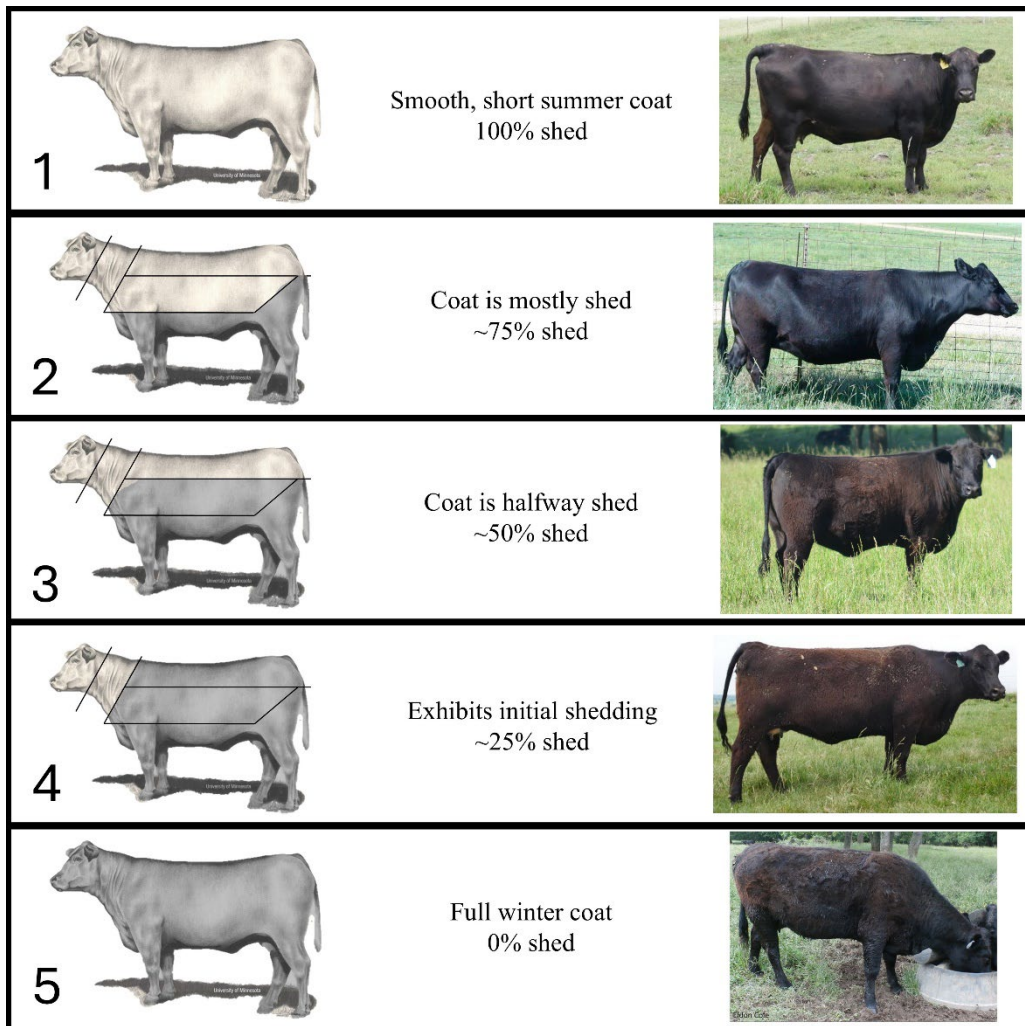
Figure 1. Hair shedding scoring system. Adapted from Durbin et al., 2020. Genetics Selection Evolution 52:63.

Hair shedding scores

Hair shedding scores are simply a visual appraisal of the extent of early season shedding reported on a 1 to 5 scale (**Figure 1**). A score of 1 is given when cattle have completely shed their winter coat and exhibit a smooth, "summer" hair coat. At the other end of the scoring scale, a score of 5 indicates an animal that retains its complete winter coat and exhibits no evidence of shedding. Half scores, such as 3.5, are not reported.

Cattle tend to shed hair from the front to the back and from their topline to their belly, but there is individual animal variation in this pattern. Whereas scores of 1 or 5 are readily apparent to even a casual observer, intermediate scores from 2 to 4 must be determined according to the following standards. A score of 2 is assigned when an animal is approximately 75 percent shed; these cattle are mostly smooth but typically have some hair remaining on their flank and lower hindquarter. A score of 3 is representative of cattle that have shed approximately 50 percent of their winter hair coat; this is essentially the halfway point in the hair shedding process. A score of 4 indicates an animal that has begun shedding but is less than 50 percent shed and closer to only 25 percent shed. A score of 4 typically has only shed the hair on their neck.

It is only necessary to collect hair shedding scores once in late spring or early summer. The date to evaluate cattle for shedding progress will vary by geographic location and environmental conditions. Scoring should occur when there is the most variation in hair shedding within a herd. In other words, a few animals with a hair shedding score of 1, a few animals with a score of 5, and a majority receiving a hair shedding score of 3.

Generally speaking, mid-May has been identified as an ideal hair shedding evaluation period for cattle in most of the U.S. As a rule of thumb, the more hot and humid the climate is, the earlier in the spring scores should be collected.

Hair shedding scores are easy to collect. They can either be collected as cattle pass through the chute or when they are out on pasture. There is no need to restrain cattle for scoring. Shedding data collection is made easier by maintaining accurate lists of which cattle are in which pastures and using data recording sheets. With preparation and planning, cattle on pasture can be scored in a matter of seconds. As another approach, hair shedding score data collection can be scheduled to coincide with routine cattle handling so long as it occurs during an appropriate timeframe for the location.

Selection for hair shedding

Beef producers across the United States should consider adding hair-shedding scores to their box of selection tools, especially in regions within the fescue belt. Earlier shedding cattle are better adapted to these challenging environments. Cattle that deal with summer heat and humidity stress better will be more productive. Ultimately, that helps improve the most important trait of all: profitability.

Although genetic progress can be made in hair shedding through selection of animals based on their hair shedding score, much more rapid genetic progress can be made through the use of expected progeny differences (EPD) for hair shedding. Following collaborative research efforts by the American Angus Association, Angus Genetics Inc., Mississippi State University, North Carolina State University, and the University of Missouri, the American Angus Association launched a production EPD for hair shedding in 2022.

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Commercial producers using Angus genetics are encouraged to consider the hair shedding EPD when identifying sires.

Likewise, producers interested in improving hair shedding and adaptation to heat stress should begin collecting hair shedding scores. In particular, seedstock producers are encouraged to work closely with their respective breed associations to collect and report hair shedding scores to help develop future genetic prediction tools for this trait.

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Reference

Durbin, Harly J., Duc Lu, Helen Yampara-Iquise, Stephen P. Miller, and Jared E. Decker. "Development of a genetic evaluation for hair shedding in American Angus cattle to improve thermotolerance." Genetics Selection Evolution 52 (2020): 1-14.

Additional Resources

Courter, J. 2024. How to Use the Hair Shedding Scale.
https://extension.missouri.edu/publications/g2041

Courter, J. 2024. Hair Shedding Scores: More Than Heat Stress
https://extension.missouri.edu/publications/g2049