It's All in the Stars…or Is It?
By Wayne Vanderwert, AGA Executive Director

This issue of the *Gelbvieh World* contains the results of DNA testing the top 25 sires in the breed for the markers associated with tenderness. The results were announced during the Productivity Committee meeting as part of the American Gelbvieh Association's Convention in Denver during the National Western.

The results created very good discussion as breeders start to ponder how we can make progress as a breed on tenderness.

The DNA technology is in its infancy, so to simplify the marketing and reporting of results of the various tests available, the commercial companies running tests have expressed the results either as stars: zero, one or, two-stars, which correspond to the number of *favorable* genes or as a linear scale (0, 1…5). While that's simple to communicate, it is now time to move beyond this and start thinking about individual genotypes for the genes involved.

From a tenderness standpoint our primary interest is in two genes that in turn produce two enzymes—Calpain and Calpastatin. Calpain, if present, promotes postmortem breakdown of muscle tissue, i.e. "aging beef", that produces a more tender product. On the other hand, Calpastatin, when present, blocks Calpain activity, and keeps the really sharp steak knife people in business.

Because we're considering two genes, two bulls that both have two of the possible four stars, may not have equal merit in a selection program that is trying to stack a favorable genotype for the next generation. It actually gets a bit more complicated because we are testing for two Calpain markers, SNP 316 and the new SNP 4751 *(see Susan Willmon's explanation on page 76 of this issue).*

Aside from that, let me work through an example that you're familiar with and only two genes, the black-red color and the horned-polled trait. Assume for a minute that you cannot see these traits, and that your breeding goal is to produce homozygous black and homozygous polled cattle. Just like your goal might be to breed favorable homozygous cattle for both Calpain and Calpastatin to help assure tenderness.

Let's also assume that we tested cattle for these traits and reported results as "stars". A four-star animal would be homozygous in both traits, that would be the goal for all animals eventually, but how do we get there? Two-star animals might be present in abundance in the population, but they could be: 1. red and homozygous polled, 2. black and polled (heterozygous in both traits) or 3. homozygous black and horned.

Simply mating a bull and cow that are both "2-star" cattle may not offer the possibility of getting you to your goal; it could keep you in the black and horned business or red and polled but not the combination you're seeking. That's exactly why we need to pay attention to where the stars are coming from and make matings accordingly.

On the other hand you could mate a red polled bull and a black horned cow and produce all black polled cattle, though they would still only be two-star cattle as they'd be heterozygous in both traits. You might be disappointed because you haven't increased the number of stars…but you have actually made a big step in the right direction. You can mate two of the black polled "two-star" cattle and have a shot at ringing the big bell, a homozygous black, homozygous polled superstar, or make some three-star cattle that are also useful to produce the next generation.

In reality this is exactly the process we've taken on the road to black polled cattle in the Gelbvieh breed. We built them by combining genetic pieces. We'll need to do the same thing if we want to stack Calpain and Calpastatin in the right direction.

My advice, ignore the stars; study the true genotypes.