By the Numbers

▶ by **Kelli Retallick,** *Angus Genetics Inc.*

Are they really my parents?

It is Jan. 14, a blizzard just rolled through, the waterers are frozen, the calving barn door needs to be dug out, and the cows need to be fed. The calving barn door finally opens. In the pen where two cows were locked together (because they were not supposed to calve) are two live, healthy calves. The calves are given iron and selenium and a tag specifying sire and dam. They are sprayed with iodine, weighed and recorded in the calving book. Now you're off to take care of the other 350 individuals.

That single calving record could be the most valuable information ever recorded on the animal.

Importance of accurate information

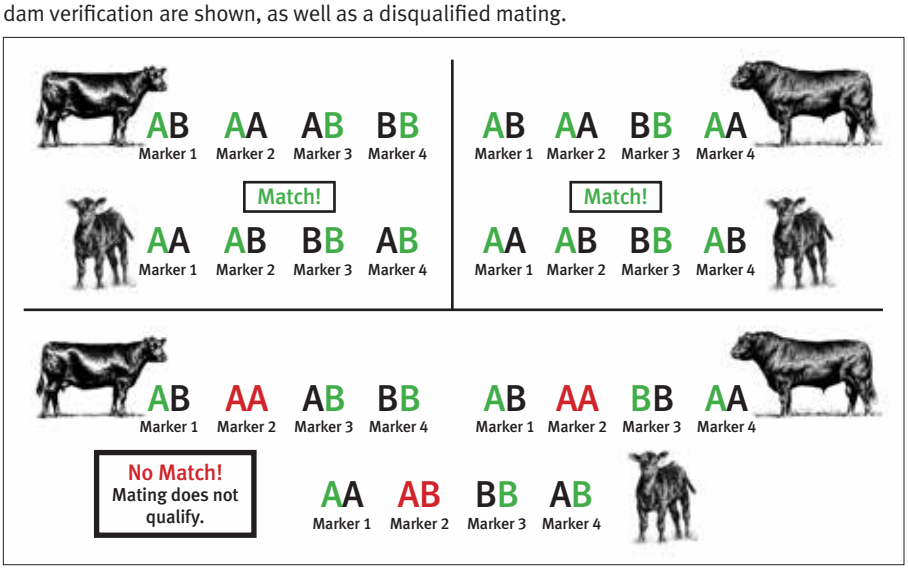
Every day hundreds of records are reported to the American Angus Association to be entered into the weekly genetic evaluation. Expected progeny differences (EPDs) and corresponding accuracies are predicted based on the information provided. Angus Genetics Inc. (AGI) works tirelessly to ensure these values are of the highest quality. Making sure the producer receives the greatest accuracy starts on their operation.

Proper parent identification on animals reported for registration is one of the most vital pieces of information in the database. This allows for appropriate pedigree assignment and estimation of EPDs, especially on young animals. Animals with no progeny or genomic information rely heavily on pedigree information to calculate these values.

In most breed association databases, a 5% error rate in pedigree reporting is observed. This not only includes sire misidentification, but also inaccurate dam assignment. Producers have taken advantage of genomic testing to correctly identify sires, especially if multi-sire mating systems or AI alongside natural-service sires are used. Today's genomic technology using single-nucleotide-polymorphism (SNP) markers can correctly identify the sire and dam mating with nearly perfect accuracy. The accuracy drops somewhat if parent-verifying only one parent to its offspring and the second parent's genotype is unknown.

When producers order products like the Zoetis HD50K or i50k and GeneSeek GGP-HD or GGP-LD tests for genomic-enhanced EPDs (GE-EPDs), parentage markers are included in the testing costs. The more affordable low-density option is allowing producers to test deeper into their herds; therefore, more genotypes are available for parentage identification. If an animal is tested with any of the available testing options for GE-EPDs and parents also have SNP markers on file, the individual will automatically be verified for parentage.

Fig. 1: Parent verification of a calf to its sire and dam
This is an oversimplified example using SNP parentage markers to parent-verify progeny to its sire and dam. In reality, 96 different markers are used in parentage analysis. Individual sire and dam verification are shown, as well as a disqualified mating.



Identity crisis

The increased testing for GE-EPDs has also increased the number of recognized animals with misidentified sire and dam matings. Usually these issues are cleared up easily and efficiently with the help of AGI's customer service team; however, confusion does arise when animals verify to the sire and the dam individually, but together the mating does not qualify. This means even though the sire individually matches the calf and the dam individually matches the calf, DNA results tell us that combination of animals cannot be the parents.

An animal's genotype is made up of a combination of the alleles from its parents. Each parent contributes half of the alleles that make up the progeny's genotype. Parentage markers identify the region on the genome identifying an animal's sire and dam. Each marker is made of two alleles; one given to the progeny from its sire and one from its dam. When an animal's parentage markers are compared to just one parent, it could be marked as verified but is not as accurate as if both parents have genotypes on file.

For example, if an animal is heterozygous (AB) at Marker 2 and its recorded parents are both homozygous at Marker 2 for the A allele (or an AA), the mating does not qualify (see Fig. 1). Because the progeny has been identified AB at Marker 2 but neither parent carries the B allele at Marker 2, the mating is disqualified. This concludes either the sire, the dam, or in some cases both parents have been incorrectly reported. One of the parents has to be carrying at least one copy of the B allele at Marker 2 for the mating to qualify.

Clearing up the confusion

Misidentification of the sire and dam mating happens. Remember those calves born in the same pen on the cold day in January? Is it possible they could have switched dams? Maybe the DNA samples

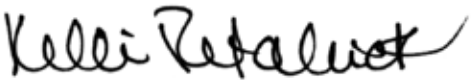
CONTINUED ON PAGE 76

CONTINUED FROM PAGE 74

were switched during ranch collection, or a short-gestation calf from a cleanup bull was born closer to the AI mating due date. The list of possibilities is long.

The Association recognizes farmers and ranchers have a difficult job, and sometimes mistakes happen. AGI team members are here to help. If an animal comes back as incorrect, AGI will contact you immediately, and the animal registration will be temporarily cancelled until the issue is cleared up. Producers will be asked to provide a list of potential sires or dams. If samples are already on file, the potential list will be compared free of charge. Potential parents not already on file will need a DNA sample sent into the Association for testing. To avoid having to cancel animals due to not having access to DNA on potential parents, producers should take a proactive approach and make sure DNA samples are taken on any and all herd bulls. The Association requires all AI sires and donor dams to have parentage markers on file before progeny can be registered.

Clearing up parentage issues allows AGI to predict the most accurate information possible for producers. Although this process can be frustrating for producers, everyone at the Association appreciates their cooperation, time and patience when executing this process.



EMAIL: kretallick@angus.org