

Parental DNA Verification

DNA verification is allowing producers to genetically identify their calves.

by *Mathew Elliott*

It's the middle of calving season and you walk out to check your cows, only to find two of them claiming the same calf. You check your records and see that both cows have similar gestation records. Now you are really confused.

Do you threaten to cut the calf in half and see which cow backs off, take the chance of putting the calf with the wrong dam and guess, or do you investigate?

As a seedstock producer, it is critical that you discover the true parentage of the calf if it is to be retained in the herd or sold. With a DNA parent verification test, you can find out which cow is actually the dam of that calf.

Bryce Schumann, American Angus Association director of member services, recently spoke on DNA parent verification

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during an American Angus Association webcast. Schumann first explained how DNA testing works.

"Parental verification using DNA works by using the DNA markers," Schumann said. "These markers are random segments of DNA found at specific chromosomal locations. The random segments of the DNA

'mark' the region, and reveal differences between individuals or between chromosome pairs for the same individual."

DNA testing is important and very useful in verifying parentage, but it is also essential for other aspects of your cattle operation. All sires used for artificial insemination (AI) (Rule 502) and embryo transplants (ET) (Rule 104 d), dams used for ET (Rule 104 d) and all cell-cloned transplants (Rule 104 e) are required to be DNA-tested. (For all rules involving DNA testing, refer to the *Breeder's Reference Guide*, which accompanies this issue.)

Kit process

The first step toward finding the correct dam is to request a DNA testing kit. These can be acquired at AAA Login (www.angusonline.org), or by contacting the registration department. Once on the AAA Login page, click "DNA Card Order Form" and fill out the form. You will then receive an FTA® Card. A blood sample on the FTA Card is the preferred type of DNA sample submission, but hair and semen can also be used.

The FTA Card uses blood directly from the animal, by either blotting the card or directly dripping blood on the card.

"It's not a good idea to draw the blood in a syringe and spray it on the card, as the blood starts to clot and you get a weakened DNA sample," Schumann said. "A good sample will fill more than half the circle on the DNA card, then be sure to mark down the ID or registration number of the animal you are testing."

Another way to send samples is by submitting semen from the animal.

Sample Submission / DNA Typing

ANGUS
THE BUSINESS BREED

American Angus Association
(616) 383-5100 • Fax: (816) 233-9703

Name: _____
Address: _____
City, ST Zip: _____
Phone: _____

Animal Name	Reg. #	Sample Type	Date of Birth	Sex

FTA Card: a white circular substrate of NucleoSpin® 204 (BioLabs, Inc.) in Agriculture Scientific, America

LOW FTA CARD

PHOTO ILLUSTRATION BY CRAIG SIMMONS

► The first step in parentage verification is requesting a DNA testing kit from the Association.

“You must send the semen sample in a crush-proof container,” Schumann said. “This is as easy as removing the ink cartridge from an old pen, taking the insides out and slipping the semen straw into a pen shell.”

The final option to submit a DNA sample for testing is by using hair. A good hair sample requires 20-30 hairs from the tail switch with the roots intact. DNA is contained in the roots, so it is very important that you can see visible roots.

This is also the preferred sample when dealing with twins. Since twins share an admixture across the placenta, using blood is difficult when dealing with twins, Schumann said.

After obtaining the samples, print the submission form from AAA Login and insert the registration number of the animal in question. Ship the sample, the order form and your payment to MMI Genomics Inc., the Association’s current official parent verification lab. To make sure your samples arrived at their destination, you can check their progress on AAA Login, where it shows all of the cases received and awaiting results, but not recorded.

Understanding your results

Once the lab has recorded your results, you will be able to look at them in the same AAA Login page you used to check their progress. When the lab is finished, it will move from the awaiting results column to the results received column. From there you can click on the link to your case number.

The results section will contain all of the case information that you initially provided, case sample number, registered name of animal or tattoo, registration number, sex and date of birth. The next two sections are the registration of the sire and dam and the interpretation of results sections.

“The lower line on the registration section will show the comparison between the dam and the offspring independent of the sire,” Schumann said. “The middle line will show the comparison between the sire and the offspring independent of the dam. Then the top line will tell you if the DNA types qualify together to be the parents of the calf.”

If all three of these interpretations show qualified results, this means that the listed parents qualify as the parents of the animal tested. Should any of the comparisons not qualify, they would show as excluded in the results column. There is also the possibility that the DNA is not available for one or either of the parents, which is represented as “genotype profile not on file.”

“There are two instances where replacement samples may be needed,” Schumann said. “If the sample fails the testing procedure after two attempts, or if the

sample is a mixture, containing two types of DNA, samples may be replaced with no charge. If it is shown as a mixture sample, it usually indicates twins, as twins share white blood cells across the placenta. This will require that you send in a replacement hair sample.”

Growing importance

Schumann gave a hypothetical example of which dam and sire were the parents of the calf, showing how they matched alleles and genotypes from the parents.

“To give a perspective about how many tests are being used by the Association’s

members, I’ll give you a historical perspective,” Schumann said. “In the last five years we’ve grown at an annual rate of 26% — from a low of 3,679 in 2001, to 18,131 in 2006. This is obviously a program that is growing. There are many ways to use it, and it’s a technology that provides answers in a very economical manner for our members.”

This webcast can be seen in its entirety at www.angus.org/AngusEducation.html under “AAA Webcasts.” For any questions on parental DNA, contact Bryce Schumann at bschumann@angus.org.

