

Collecting DNA Samples for Angus Australia



Collecting DNA samples is becoming a routine management practice within an Angus seedstock beef enterprise, with Angus producers using DNA information for parentage verification, management of recessive genetic conditions, and to add accuracy to Angus BREEDPLAN EBVs for important production traits.

DNA samples can be collected in a number of different forms, with hair, semen and tissue samples all accepted for testing with Angus Australia.

Hair Samples

Hair is the most common form of sample used when submitting DNA to Angus Australia, and is Angus Australia's preferred sample type.

Hair samples should be collected from the switch of the tail, by selecting 40 hairs (approximately the size of a thick pencil) that are dry and free of any foreign matter (e.g. manure, dirt), and pulling the hairs "up and away" from the tail switch. Pliers can be used if a better grip is necessary.



It is important to note that the DNA is not contained in the hair shaft itself, but rather in the follicle or root bulb. It is vital that the root bulb is present in the hair sample as this is the part of the sample from which the DNA will be extracted.

Once the hair sample has been collected, it must be placed in a DNA collection kit. DNA collection kits are available on request from Angus Australia, for both Zoetis and the University of Queensland.



Collection of hair on extremely young animals can be problematic as the hair follicles are small and still developing. It is recommended that animals are at least 60 days of age (2 months) before hair samples are collected.

Hair has several advantages over other types of DNA samples including a lower cost of sample collection and easier long term storage of samples at room temperature. Hair samples stored on file can be resubmitted at a future date for further testing if required.

One strategy becoming increasingly common amongst Angus Australia members is the collection of hair samples on all calves at marking/weaning, whereby the hair sample of each animal is placed in an individual envelope and stored in a cool, dry place (e.g. shoe box, filing cabinet) for use when DNA testing is required.

Handy Tips When Collecting Hair Samples

- Check the identification of the animal and record the full Angus Australia ident on the front of the collection card (Zoetis), or on the sticker provided (University of Queensland).
- Pull a minimum of 40 hair follicles from the switch (i.e. thick brush) of the animal's tail making sure the follicles are still attached. Make sure that at least 40 hairs are supplied so that sufficient hair is provided to enable future DNA tests to be conducted for the animal.
- If a hair sample is being provided and multiple DNA testing is required (such as testing for parent verification and genetic condition status), it may be advisable to collect two hair samples to ensure that adequate DNA is available.
- Pestivirus testing requires one full sample. This sample must be pulled fresh (within three weeks) of testing.
- Ensure the DNA sample collected is dry and free from any foreign matter (dirt, faeces and plant material). If necessary, the hair can be brushed prior to collection to remove the foreign matter.
- When collecting hair samples, place the hair sample in the collection kit, align hair follicles, and securely place the animal ident sticker over the hair shafts (University of Queensland) / remove the paper backing and lower the front of the collection kit over the hair shafts (Zoetis). Trim off excess hair to the edge of the collection kit.



- Take care during the collection process to prevent cross-contamination of samples. If necessary, wash hands between the collection of each hair sample to ensure that hands are clean.
- Ensure that the Angus Australia DNA Test Request form is completed. If you haven't previously completed a member's test agreement form, please also submit one.
- Place samples and completed paperwork in a sturdy postage bag or box. Consider sending samples by registered mail.

Semen Samples

Semen samples are commonly used when DNA testing AI sires, imported sires, or old sires for which no other type of DNA sample is available.

When submitting semen samples, it is best to remove the straw from the liquid nitrogen and allow it to gently thaw in the refrigerator or at room temperature. Do not store straws at room temperature for long periods of time before submitting the sample as it may mould.

Thawed semen straws need to be carefully protected when mailing to prevent damage from mail sorters and rough handling. A good strategy is to place the semen straw into the shaft of a ball point pen. That is, take the ball point pen, remove the ink tube, insert the semen straw, and replace the cap of the pen.



Alternatively, semen straws can be placed in a slot between two ridges of cardboard. The protected semen straw can then be placed in a sturdy postage bag or box.



One limitation of semen is the inability to store any sample surplus to the initial DNA testing requirements for future DNA testing of the animal. Consequently, in addition to the DNA testing, semen samples also require DNA to be extracted and stored at the DNA laboratory. There is a surcharge per sample to cover DNA extraction and storage costs (University of Queensland). There is no surcharge when testing with Zoetis Animal Genetics.

Tissue Sample Units (TSU)

More recently, some members have commenced using tissue sampling units (TSU), such as those marketed by Allflex, to collect DNA samples.



TSUs involve the use of specialized equipment that takes an ear notch, places it in a collection tube that contains preservative, and seals the collection tube.

When using TSUs, it is important to carefully follow the directions that are provided to ensure the samples are correctly collected. Samples may be stored at room temperature, in the fridge or in the freezer until they are ready to send, before mailing them in a sturdy postage bag or box. Keep the samples out of direct sunlight before mailing as UV rays will denature the DNA.

TSUs are often integrated with ear tags, with the collection tube having a bar code that corresponds to the NLIS and management tag, which helps to prevent human error and sample mix-ups.

There are additional costs of using TSUs, including the cost of the collection equipment, and the cost of extracting and storing DNA at the laboratory. Similar to semen samples, it is not currently possible to store any sample surplus to the initial DNA testing requirements for future DNA testing of the animal, and so there is a surcharge per sample when using TSUs to cover the cost of DNA extraction and storage.

Tissue Samples

Tissue samples not collected using a tissue sampling unit are only used in situations where it is not possible to collect any other form of DNA sample. Most commonly, this is when calves are born dead.

When collecting tissue samples, part of the ear or tail should be removed, and then frozen until it is ready to be sent to Angus Australia. It is important to try and preserve the sample as much as possible during postage. Frozen tissue samples should be placed in a plastic bag, attached to a cool pack, and then mailed in a suitable package, such as a small styrofoam esky.



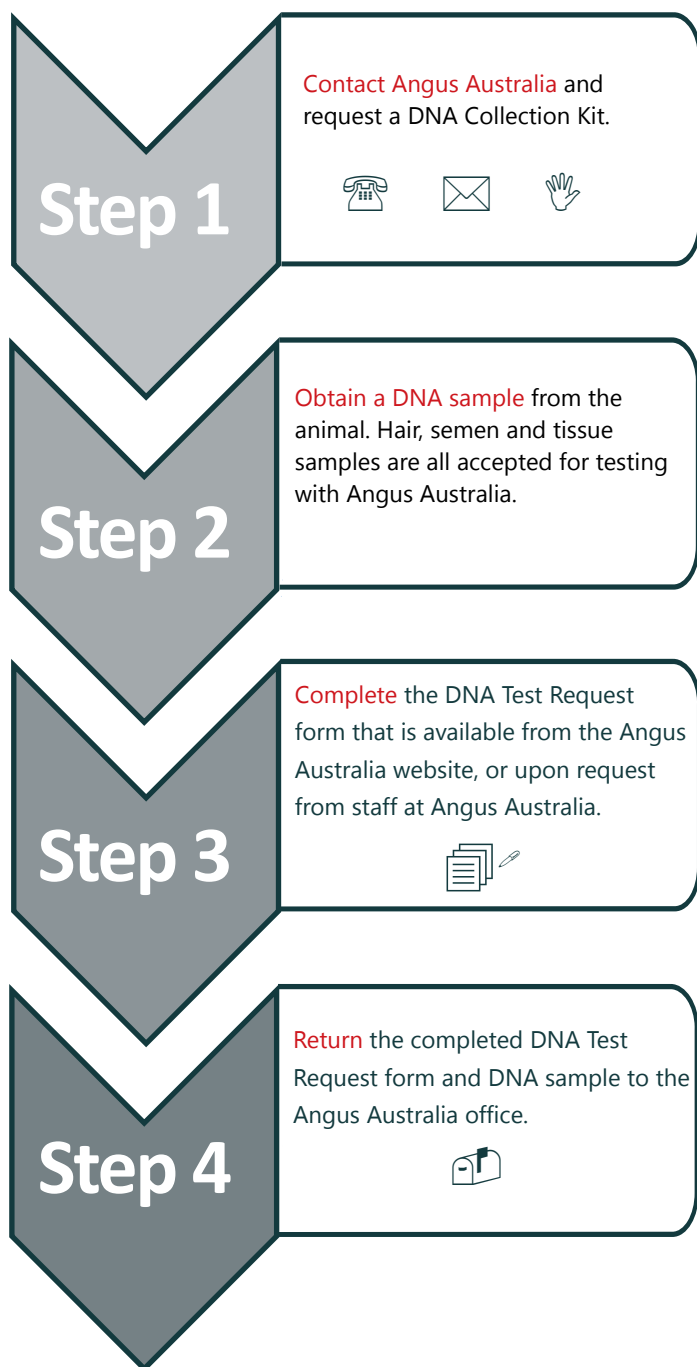
As with semen and TSUs, it is not possible to store the surplus tissue sample for future DNA testing of the animal, and so DNA needs to be extracted and stored at the laboratory. There is a surcharge per sample when using tissue samples (University of Queensland). There is no surcharge when testing with Zoetis Animal Genetics.

Other Sample Types

There are a number of other types of DNA samples that can be collected from animals, such as blood tubes, blood cards and nasal swabs. These sample types are not currently accepted by Angus Australia and should not be used.

Steps for Submission of DNA Samples to Angus Australia

The process for testing an Angus animal with any of the DNA services offered by Angus Australia is the same.



Availability of Results

Upon receipt of the DNA sample, Angus Australia staff will process the sample and forward it to the relevant laboratory for testing.

Once the testing is completed, the results are returned to Angus Australia and automatically stored on the Angus Australia database. At this time, notification of results will be sent via email and the members download area. Genomics and DNA parentage profiles will automatically be made available for parentage verification and inclusion in the gene probability and Angus BREEDPLAN analyses.

Results are usually available within 4-5 weeks, with very similar turnaround times for each of the different genomic products.

If testing with Zoetis i50K and HD50K products, the genomic predictions are also provided directly by Zoetis to the member undertaking the testing. Genomic predictions are not routinely provided when testing with the GeneSeek GGP genomic products.



It usually takes 4-5 weeks for DNA testing results to become available. It is important to submit DNA samples well before results are required.



It is important that DNA samples are submitted through Angus Australia. Results from genomic tests not conducted through Angus Australia will not be included in the Angus BREEDPLAN analysis.

Cost of Genomic Testing

The cost of testing differs depending on the genomic test that is being conducted. Costs for the different genomic tests can be found on the Angus Australia website.

For further information, please contact staff at:

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