

Collecting Samples for DNA Testing Purposes



TIP SHEET

The utilisation of DNA information in beef breeding programs has become increasingly widespread. For beef producers, the three major applications of DNA information are:

- Parentage verification.
- Management of genetic conditions and/or qualitative traits (e.g. horn/poll status, coat colour).
- Genomics (the use of DNA information in the BREEDPLAN genetic evaluation).

In practice, many beef producers undertake DNA testing of their animals for a combination of these reasons.

WHAT SAMPLE TYPES CAN I COLLECT FOR DNA TESTING PURPOSES?

There are several different sample types that are commonly collected by beef breeders for DNA testing purposes. These include:

1. Tissue Sampling Units (TSUs)

Beef producers collect an ear plug sample from their animals using a specialised applicator gun (shown below). TSUs can be collected from birth and are often collected in conjunction with calf tagging. TSUs have a unique barcode system that can be linked to



animal ID tags (including NLIS tags). This barcoding system, along with machine processing, means that sample mix-ups are less likely than for other sample types.

TSUs can be shipped at room temperature; however, once the tissue samples have been collected, TSUs are not suitable for long term storage in a home environment.

2. Hair Samples

Hair samples are collected by pulling approximately 40 hairs from the tail switch of an animal. These hairs should be clean (i.e. free from any foreign matter such as manure) and dry. As the DNA is contained in the root bulb, it is important that hair samples are **pulled**, and not cut.

Collecting hair samples from calves younger than 60 days of age is **not** recommended as the hair roots are still developing. Instead, hair samples are commonly collected when calves are brought into the yards at weaning.

Hair samples are suitable for long term storage at room temperature in a home environment.



Image courtesy of Seifert Belmont Reds

3. Semen Samples

Semen samples can be collected from mature bulls. While TSUs and hair samples can be collected when a bull is still immature, one advantage of a semen sample is that it can be used to procure DNA when the physical animal is not readily available (e.g. overseas and/or deceased sires).

Semen straws should be thawed prior to postage; however, they should not be left to sit at room temperature for prolonged periods of time. Semen straws should also be protected to prevent damage while in transit; placing each straw inside an empty pen is a good option. If sending multiple straws, each should be placed into a separate sealed plastic bag to prevent contamination of all straws should one break in the post. Please note that only unopened semen straws can be processed.

HOW DO I SUBMIT SAMPLES FOR DNA TESTING PURPOSES?

DNA testing for beef cattle is conducted by commercial genotyping service providers. Many breed societies have arrangements with commercial genotyping service providers that cover sample submission protocols and testing costs. If your breed society has such an arrangement in place, then a major advantage of utilising this is that it ensures that any DNA tests you undertake can be entered against the relevant animal on the relevant database. This will allow the DNA test results to be utilised in any relevant analyses. Please contact your breed society for further details of their DNA testing arrangements.

WHAT CONSIDERATIONS SHOULD BE MADE WHEN COLLECTING SAMPLES FOR DNA TESTING PURPOSES?

- Beef producers should note that only **some** BREEDPLAN analyses currently utilise genomics information (typically referred to as Single-Step BREEDPLAN analyses). If you are unsure whether your BREEDPLAN analysis includes genomics information, please contact staff at your BREEDPLAN processing centre for further information.
- Sufficient time should be allowed for DNA samples to be included in the BREEDPLAN analysis. This process is not a quick one; once received by the commercial genotyping service provider, samples are processed (this step alone typically averages three to four weeks). The resulting DNA information is then returned (typically to the breed society) to be loaded onto the relevant database, where it will wait until the next BREEDPLAN analysis takes place.

In the majority of cases, a three to four month turnaround should be sufficient time for this process to take place. However, a small subset of animals may require re-sampling. Therefore, if producers require the resulting EBVs for a time-sensitive purpose (e.g. selection of replacement heifers, to include in sale catalogues), it is recommended that DNA samples are submitted **at least six months in advance** of their deadline.
- The long-term home storage of samples for DNA testing purposes is highly recommended. Done correctly, the storage of such samples can be done at very low cost and provides 'insurance' against a number of eventualities. These include:
 - Re-testing required. A small number of samples will require re-testing before a valid DNA result can be obtained. Therefore, the collection and storage of a second spare sample when the first is collected allows a re-sample to be sent to the laboratory without the need to muster then animal back into the yards for re-sampling.
 - Further testing on already tested animals. Breeders may initially only perform one of the smaller DNA tests (e.g. a single genetic condition) but decided they want more DNA information (e.g. additional genetic condition test and/or genomics) in the future. There is no guarantee that the commercial genotyping service provider will have sufficient

sample remaining from the first sample, so having a second sample in storage is convenient for re-submission.

- Future testing of untested animals (alive or dead). The storage of samples collected on every animal in the herd allows future testing of any animal if any questions regarding parentage and/or genetic condition status arise. This includes future genetic conditions that are not yet identified.

Of the three sample types outlined in this tip sheet, hair samples are particularly well suited for cheap and convenient long-term storage. Each individual hair sample (with root bulbs attached) should be placed in a clearly identified paper envelope and stored in the dark at room temperature (e.g. in an office draw or filing cabinet). The storage of hair samples in plastic bags can lead to them 'sweating' and going mouldy so is not recommended. Neither semen straws nor TSU samples are recommended for long-term

storage at room temperature.

- A number of breed societies offer DNA testing 'bundles'. These package a number of DNA tests together, allowing breeders to request parentage verification, genetic condition testing and/or genomics for a single price point. This single price point is usually cheaper than requesting each DNA test individually, while also having the added advantage of simplifying the request process.
- Beef producers should be aware that some commercial genotyping service providers may charge surcharges to process certain sample types. Information on sample type surcharges should be available from your genotyping service provider and/or your breed society.

For more information regarding DNA sample collection or genomics in general, please contact staff at your BREEDPLAN processing centre.



Scan the QR code or click [here](#) to view a short video on collecting samples for DNA testing purposes

