

Across-herd Genetic Evaluation (AGE) for Alpacas

How to assess and record traits

There are two main groups that traits can be separated into when we are considering how to assess traits:

- measured traits, and
- subjectively scored traits.

Measured Traits

Fleece traits evaluated at the midside sample point

The most commonly recorded fleece traits are derived from the midside sample and the subsequent fibre analysis. *The method used to identify and sample the fleece is of critical importance.* The midside sample is defined as the fleece that arises from the skin in an area midway along a line joining these two points - where the skin behind the front leg meets the chest wall, and where the skin in front of the hind leg meets the abdomen. The midside is best sampled when the alpaca is being held in front by a person, while the sampler stands on one side of the alpaca, leaning over the backline, identifying the two points described above with the middle fingers of each hand. The point midway between them can be easily estimated and then the fleece from this area can be sampled. A suitable sample of fleece is gathered in one hand, and the other hand is used to cut it as close to the skin as possible. The midside sample is then placed in its own bag as required by the laboratory, the identification of the animal recorded and the samples dispatched for testing.

All the alpacas in a progeny group should have their midside samples taken on, or as close as possible to, the same day. The midside sample should be taken when all the alpacas in the progeny group are over 6 months of age and have 6 months or more fleece growth. Midside samples can be taken at shearing, however it can be an advantage to take the sample some time before shearing when there is no pressure to keep up and do all the tasks that need to be done at this busy time. An easy way to take the midside sample during shearing is to place a small rubber band over the sample selected as above, then locating this tuft when the fleece is gathered 'off shears'.

An accredited fleece testing laboratory must conduct all fleece tests, and all animals in a management group should be tested by the same laboratory, using the same method.

The fleece testing laboratory can provide the following AGE trait evaluations:

- **Mean Fibre Diameter (FD):** The mean diameter of a sub-sample of fibres taken by the laboratory from the midside sample. The unit for FD is micron (μm).
- **Coefficient of Variation of Fibre Diameter (CV):** A measure of the variation in the fibre diameter of the midside sub-sample. The unit for CV is percentage (%).
- **Comfort Factor (CF):** The percentage of fibres less than 30 microns measured from the midside subsample. The unit for CF is percent (%).
- **Spinning Fineness (SF):** An index of mean fibre diameter and coefficient of variation of fibre diameter into a single value to express fleece processing performance. The unit for SF is micron (μm).

- **Curvature (Curv):** The mean fibre curvature of the midside sub-sample. The lower the angle of the curvature, the lower the crimp frequency. The unit of curvature is degrees per millimeter of fibre length (deg/mm).
- **Medullation (Med):** The number of medullated fibres as a percentage of the number of fibres counted from the midside sub-sample. Medullation is frequently reported for both white and light fawn alpacas however as fawn can be aberrant and therefore misleading a medullation evaluation is only recommended for white fleeces. The unit for medullation is percent (%).
- **Staple Strength (SS):** The mean strength of each of a number of staples drawn from the midside sample. The unit of staple strength is Newton/Ktex (N/Ktex).

The first five of these fleece traits are normally all reported by an accredited laboratory for the same cost as a mean fibre diameter test. Medullation and staple strength are extra measurements available on request at additional cost from some laboratories. Before you take the samples from your alpaca always discuss with the laboratory you intend to use your needs (e.g. evaluations required, time taken to obtain results, the format), secondly their needs (e.g. the weight of sample, the type of bag to send in the sample and the type and location of the marking to identify the alpaca) and thirdly the cost of the evaluations you require.

- **Staple Length (SL):** Best measured after the midside sample is taken by using a wooden, plastic or metal ruler that has an end that starts flush at "0 mm". The ruler is laid onto the midside, allowing the fleece to fall back onto the ruler and read the length. The unit of staple length is a millimetre (mm).

Specialist Laboratory Tests. A very small number of laboratories can measure the following traits – from a 10 mm circle of skin surgically removed from the midside point:

- **Skin thickness (SkinT):** The unit of Skin is a millimetre (mm).
- **Skin follicle density (SFD):** The unit for SFD is follicles per square millimetre (f/sq mm).
- **Secondary / Primary follicle ratio (SP):** The unit for SP is a number ratio.

Other measured traits

As with fleece traits all the alpacas in a progeny group should be measured on or as close as possible to the same day. For some traits such as body weight it is even more critical to record the group in a short period to ensure consistency. Fleece weights must be taken when all the alpacas in the progeny group are over 6 months of age and when they have 6 months or more fleece growth.

- **Gross Fleece Weight (FW):** This must include everything shorn from the alpaca (skirting's, belly, neck, saddle, pieces of low or no current value.) Fleece weight is best obtained at the time of shearing by placing the saddle in a big plastic bag, and the other parts in separate plastic bags after which all the bags are placed on the scales to be weighed. Use a system that ensures all the bags for a fleece are on the scales when the weight is taken. Reduce the weight measured by the scales by the weight of bags or preferably adjust the scales so they read zero with only the weight of the bags are on the scales. Digital kitchen scales are a popular way of obtaining the weights accurately. Before each day of fleece weighing check the scales are accurately weighing a standard weight when repeatedly placed on the scales.

- **Skirted Fleece Weight (SFW):** The weight of the gross fleece not including skirtings, belly, and pieces of low or no current value. It is the "prime fleece" in a commercial sense that is being weighed. If the saddle and the neck are different lengths they should be bagged separately before being placed on the scales. Skirted fleece weight is a valid trait if the degree of skirting is consistent for all the alpaca in a management group, which requires the same level of skirting and therefore it is best performed by the same person.

Only one of the two fleece weights need to be recorded, preferably gross fleece weight as this is more consistent.

When recording either gross or skirted fleece weight the period over which the fleece is grown needs to be specified as shown on the Recording Form. If the shearing of a progeny group takes place over a number of days (but less than 10 days) the middle day should be recorded as the date of assessment for all the alpacas in the group.

- **Body Weight (BW):** The weight of the alpaca after a minimum of four hours off feed and water. The group of alpacas can be yarded overnight, and the body weights recorded early the next morning. All the alpacas in any one management group need to be weighed within a three hour period except for birth weight which is preferably recorded at the time of birth or within 24 hours (however may be measured at any time in the first 5 days.)

Body weight can be recorded at one or more of the following age periods; Birth, Birth up to 7 months, 7 up to 13 months, 13 up to 25 months, over 25 months. Record CW (Cria Weight) on the top of the data column for birth weight - no separate date is required to be recorded. For all other body weights record BW and the applicable date (ddmmyy.)

- **Testicular size (TS):** Measure the long axis of both testicles and record the mean length in millimetres (mm). Record all the alpacas in the group preferably on the same day (but within a maximum of 10 days) when they are between 13 and 25 months of age. The length is best done using calipers (plastic calipers available cheaply from Woolworths, hardware stores and some stationery outlets).

Scored Traits

There are five scored traits that can presently be recorded in the AGE. Scored traits are those traits that can't be directly measured, however they can be effectively recorded using a standard scoring system - a 1 to 5 subjective assessment.

The AGE scored traits are **Guard Hair, Lustre, Frame, Face Cover** and **Bite**. As with all traits these five are optional to record – for interest to you and/or your clients, and for possible later research use.

While it is critical to be consistent when recording a group of alpacas and to use the scoring system presented below, some variation in the degree that different observers apply to the scores can be adjusted for in the AGE analysis. The adjustment is made in the same way environmental variations (eg. nutrition and climate) are dealt with. That is, the fact that one observer measures lustre on a given alpaca as a 2 while another breeder may score it as a 3, can be compensated for when it is compared with all other alpacas in the database, *so long as the scores recorded by each observer are consistent within their group of alpacas being assessed*. By comparing animals across the database (where there are linkages provided by common sires or dams) the AGE software program is able to calibrate the scores and standardise them across different groups - and hence different observers.

Hands-on training and photographic standards will assist your scoring skills, however scoring is straightforward if the following three basic principles are applied,

- i. It is critical to **score consistently within a group**.
- ii. The 1-5 scores for a trait need to **cover the full range of alpaca performance for that trait**, not just in your herd, but all herds.
- iii. **Use the score descriptions** listed below, and in the Trait listing.

The general rule for scoring the traits Guard Hair, Lustre, and Frame is that a score 1 is a "better" performance than score 5. For Face Cover and Bite both 1 and 5 score extremes represent undesirable characteristics, with 3 most desirable.

The following is the description that must be used of each of the five scored traits.

Guard Hair - The level of guard hair **across the entire fleece**.

1 - Very low level of guard hair, **2 - Low** level of guard hair, **3 - Average** level of guard hair, **4 - High** level of guard hair, **5 - Very high** level of guard hair.

Lustre - The degree of lustre of the fleece at the midside site.

1 - Very high degree of lustre, **2 - High** degree of lustre, **3 - Average** degree of lustre, **4 - Low** degree of lustre, **5 - Very low** degree of lustre.

Frame - The size and proportion of an alpaca relative to others of the same age and nutrition.

1 - Very large and heavy frame, **2 - Large** and heavy frame, **3 - Average** frame, **4 - Small and light** frame, **5 - Very small and light** frame.

Face Cover - The area of the face (in front of the ears, on the jaw, around the eyes and on the muzzle) that is covered with long fibre.

1 - Very bare face, **2 - Bare** face, **3 - Average** face cover, **4 - High** cover, **5 - Very high** coverage.

Bite - Alignment of the front incisors with the top dental pad - undershot, good alignment, or overshot.

1 - Severely undershot (>5mm short of the pad), **2 Undershot** (including and between 5mm and up to the pad), **3 - Meeting** the pad, **4 - Overshot** (between the pad and 5mm past the pad), **5 - Severely overshot** (>5mm past the pad),

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