

# FLEECE TESTING

**An essential tool for a successful breeding programme and assembling specialty lines of fibre.**

by Don Morrisson

Successful breeding programmes involve the use of many different tools to help you determine whether your breeding aims are being achieved. Fleece testing is an objective tool to monitor the changes in individual and herd fleece characteristics.

There are many different fleece characteristics you can choose to monitor other than micron (Mic), standard deviation (SD), and coefficient variation (CV). What you grow your fibre for depends which characteristics you will choose. For arguments sake, high curvature is highly desirable for woollen process carpet, and knitting yarn, but not so important worsted yarn.

What is worth remembering is that fleece statistics are relevant to your farm only. This is because fleece and its growth will differ hugely depending on following:

- Genetic traits of your sires
- Feeding
- Nutrient availability
- Animal health

It is important to note that whether you are monitoring fleece changes from individual mating's or whole herd fleece changes, the increments of change can be small and slow. Do not get disheartened if you feel that you have not made the massive gains you intended, but rather look for a shift in the right direction. This may mean that if you are trying to lower your SD and create fleeces with a more uniform micron, you may only lower your SD by 0.3 of a micron, for example. However this will enable you to recognise a positive or negative shift in the characteristics you are monitoring. Over several years the changes can be significant.

## How much do I need?

Not much is needed... the width of your little finger is all that is required but seeing that everybody has different sized fingers approximately one staple from a huacaya and one lock, from a suri. It is good practice to cut enough fleece for 2 samples. This way, should something go wrong or you wish to retest a fleece you have a backup that can be accurately compared.

## Where should I take my fleece sample?

The mid-side of your alpaca is accepted as the best place to find the average micron of your fleece. Place your thumb on the backbone and forefinger on 2nd to last rib, part fleece, using sharp scissors snip sample. Make sure that you cut your sample as close to the skin as possible. Place in a PAPER bag. Or staple to note paper. CLEARLY write ID (Numeric numbers are preferred).

**NOTE:** It is important to remember that the samples must be dry. Moisture in the samples can skew the results considerably. Putting them in closed plastic bags can reveal that they have moisture even if they feel dry so it is good practice to lay them out to dry before putting them in paper envelopes or bags.

## When do I take my sample?

It is best to take your fleece samples before shearing. There are a few good reasons for this.

1. You can make sure that you are taking the sample from the right place on the animal every time rather than guessing where the mid-side is once the fleece is shorn
2. You can limit contamination from other micron fibres that can occur during shearing
3. Knowing your results before shearing means that you can shear animals in groups where the fleeces are similar and they can all be collected in one fadge. This will also help to reduce contamination of coarser fibres with fine fibres in the shed.

## What do the results mean?

Reading your results does not have to be difficult. Here are a few explanations for the terms you will find while reading your report.

**Mean Micron ( $\mu$ )** – Overall average fibre diameter measured in microns, of sample sent for testing.

Micron has the largest influence on the price of natural fibres and because it is highly heritable it is regarded as an important characteristic to monitor.

The lower the micron the finer the yarn can be spun. A single yarn thread requires the same number of fibres whether the micron is fine or broad. So coarse micron can never be spun into a fine thread.

Yarn is measured by weight (grams per km) and is known in trade as tex. The lower the tex, (gram/mtr<sup>2</sup>) the lighter the fabric can be woven or knitted.

On average of all micron variation 80% is within a fibre staple. 5% is within a fleece. 15% within a flock.

**Standard Deviation (SD)** – Standard deviation is a measure in microns of where 2/3 of the fibre diameter measurements, that lie either side of the average fibre mean diameter. A measurement below 4.5 is desirable.

**Coefficient of Variation (CV)** - This is essentially the same as SD but it is measured as a percentage. CV= SD divided by Mic. times 100. Low CV is desirable and you should aim to be lower than 20%.

**Coarse Edge (CEM)** - The coarse edge measurement is the percentage of measurements that are 10 microns greater than the average mean micron. Generally it would be preferred that the CEM be below 4%. Although this measurement is not widely used it does give a better indication as to the overall fleece's spinning quality.

eg. Fleece 1 has a 19 $\mu$  Ave, SD 3, CV 19, CEM 8  
Fleece 2 has a 19 $\mu$  Ave, SD 4.5, CV 20.3, CEM 2

Both Fleece 1 and Fleece 2 are the same micron, Fleece 1 even though it has a lower SD & CV it would not be able to be spun to a tex as low as Fleece 2, owing to the fact that there is 6% of the fibres within the fleece are greater than 29 micron. Remember that higher SD is not necessarily fibres that are much coarser. It may be, as with the case of Fleece 2, that the higher SD comes from a large proportion of fibres falling much lower than the 19 micron average.

The SD, CV & CEM, measure the uniformity of micron of the staple. Good uniformity means a more desirable handle (how it feels to touch). You should aim as low as possible for SD and CV, but below 4.5 microns for SD or lower than 20 if looking at CV, is reasonable. We know that alpacas in early history had an SD of 1... something to aim for!!

**Comfort Factor (CF)** - Wool worn next to the skin causes a sensation with many people which at best could be described as a prickle. Prickle was originally considered to be an allergic reaction to wool, but research has shown that prickle has nothing to do with allergy. It is in fact due to coarser fibres digging into the skin with sufficient force that it excites the pain receptors in the skin.

Sensitivity differs greatly from person to person, research has shown that in general fabric that has less than 5% of 30 micron fibres present will not be felt to prickly by most people. So the bench mark for fabric made from fibre suitable to be worn next to the skin is greater than 95%.

**NOTE:** Comfort Factor measurement was devised with mid-micron & strong merino sheep's wool in mind, the 95% bench mark may be lower for alpaca fibre as it appears that alpaca fibre is not as rigid as wool of the same micron.

**Curvature (cur) deg/mm** - Curvature is measured in degrees per millimetre. *Curvature Ranges in Alpacas:* Suri low 10 @ 30 high. Huacaya low 30, high @ 70. Compared to wool, alpaca is relatively low curve. Importance of curvature is dependent on what you want to use your fleece for.

High curvature is useful in the woollen process and knit fabric. High curve fabric has greater insulation properties, reflect the light differently to low curve, giving perception of deeper colour, will usually be stronger in micron than it would appear to the naked eye.

**Staple Length (mm)** - Is the length of the staple measured.

**SD Along** - This measures the changes in fibre diameter along the fibre sample from the butt to the tip. It must be remembered again that **SD Along** measurement only covers **2/3 of the total measurements taken** so it misses out on the extremes, making this measurement irrelevant in most situations.

