READING FIBRE TEST RESULTS

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Australian Alpaca Fibre Testing

Introduction

Monitoring objective fibre traits using fibre measurement makes a lot of sense. It allows fleece growers the opportunity to select alpacas that are likely to produce the more valuable fleeces. More importantly, it also provides an insight into the genetic potential of breeding stock to produce progeny capable of growing premium fleeces.

Fibre testing, however, can be like an ambush for the unwary. There is much misinformation as to what fibre test results mean and how they should be applied. The following is a short guide to help dispel some of these fibre testing myths.

How to Take a Fibre Sample

The main points to note regarding mid-side sampling are as follows:

1 Always use the same sample site. This will enable you to effectively compare results. The preferred and most commonly used site is the mid-side. The mid-side is located half way between the fore and hind leg and half way down the body mass. The left hand side of the alpaca is normally used for the mid-side as the right side is exposed to judges when showing.

2 To breed for reduction in variation of fibre diameter across the fleece, three sample sites may be used. In this case, the mid-side, the shoulder area and the pin-bone (hip) are recommended.

3 For OFDA2000 testing, the size of the fibre sample needs to be only the width of two fingers.

4 When cutting the sample from the alpaca, ensure the sample is taken as close to the skin as possible so that a complete test analysis can be conducted on the whole length of fibres.

5 Place the sample in a paper bag. If a plastic bag is used, the bag should not be sealed as condensation build-up can distort the fibre measurements. Record the alpaca's name and/or tag/IAR number on the bag,.

6 Send the samples to AAFT with any required documentation (refer www.aaft.com.au).

Interpreting Test Results

So, now that you have got the results of a fleece test, what does it all mean? The following is a list of commonly used terms for fibre testing.

Micron: Unit of measurement for describing diameter of fibre. 1,000 microns = one millimetre. Fibre diameter is the single most important fibre trait with regard to commercial processing. It is also one of the most heritable fibre traits

Mic Dev: (Micron Deviation) The extent to which a sample deviates from the herd's average.

SD: (Standard Deviation) A measurement to show how much a set of individual results from within a sample vary from the overall sample's average. One

standard deviation is how far from the average you need to go to capture about two thirds of the sample. For example, a staple has an average diameter of 20.0 microns with a SD of 5.0 microns. In this case, about two thirds of the fibres in the staple are between 15.0 and 25.0 microns. The lower the SD, the less variation in fibre diameter. SD is the preferred measurement for determining fibre diameter variation on individual animals. Alpacas with low SD generally have a softer handle, greater tensile strength, and less variation over the fleece area.

CVD: (Coefficient of Variation of Diameter) Is the standard deviation expressed as a % of the sample's average. For example, if the average diameter is 20.0 microns with a SD of 5.0 microns, the CVD is 25.0%. (5/20 x 100)

CF: (Comfort Factor) Percent of fibres in a sample that are equal to or less than 30 microns. Fibres greater than 30 microns are generally responsible for the prickle sensation when worn next to the skin.

CEM: (Coarse Edge Micron) The distance (in microns) between the average diameter and the finest extremity of the coarsest 5% of fibres. This is commonly used to assess the influence of primary fibres within a sample.

<15%: The percent of fibres in a sample less than 15 microns.

CRV: (Fibre curvature) expressed in degrees/millimetre. Generally, higher curvature is associated with higher crimp frequency.

SF: Spin Fineness: Calculation using micron and CVD to represent the spinning quality.

Micron Profile: A graph showing the variation of fibre diameter along the staple. Can be used for analysing the nutritional intake over the growing season.

Histogram: A bar graph depicting the distribution of average fibre diameter of the individual fibres within the sample. On the vertical *(y)* axis of the graph is the micron of the fibre counts. On the horizontal (x) axis are a series of numbers which represent the frequency of distribution of those fibres counted.

SL: Staple length expressed in millimetres. Staple is another term for fibre bundle

Max Mic. The broadest point along the staple, expressed in microns.

Min Mic. The finest point along the staple, expressed in microns.

FPFT: (Finest point from the tip) Millimetres from the tip to the finest point in the staple. An indicator for the 'point of break'.

MFE: (Mean fibre ends) The average fibre diameter of the fibre ends [tip and base] expressed in microns.

Hauteur (predicted): The estimated length of fibres after scouring, carding and combing. As a rule, the two most important properties of wool for processors are diameter & hauteur.

Example of two sets of results including data, histograms and micron profiles. Analysis of the results follows below the examples.

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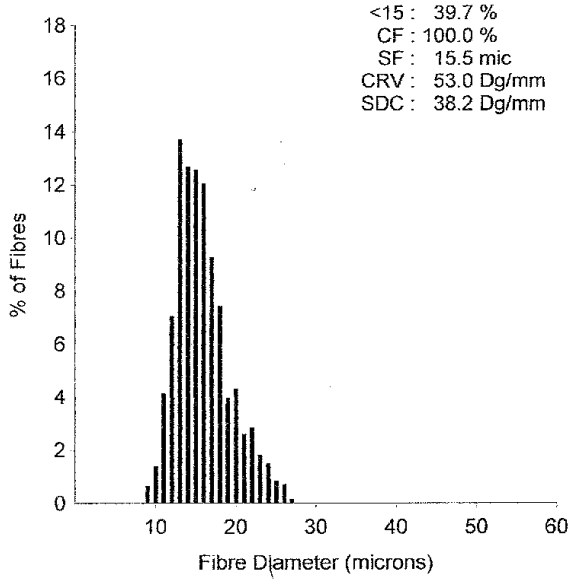
OFDA 2000 REPORT : SORTED BY TAG
[redacted] (2Records)

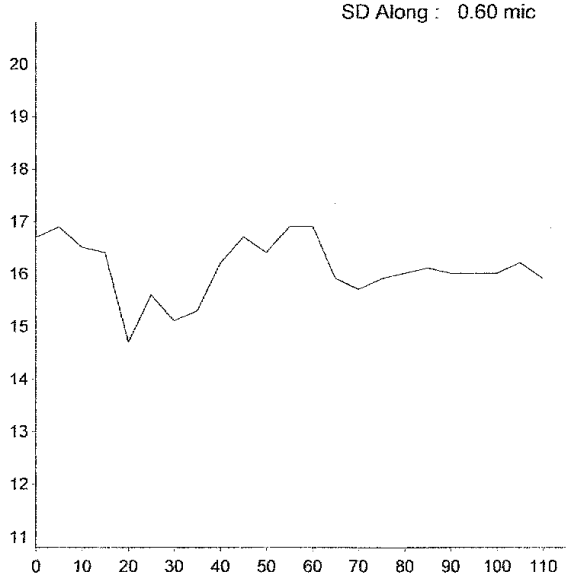
Job Details
Alpaca samples

Reference: 0231 - 0250
Tested: Dec 05, 2007 - Dec 12, 2007

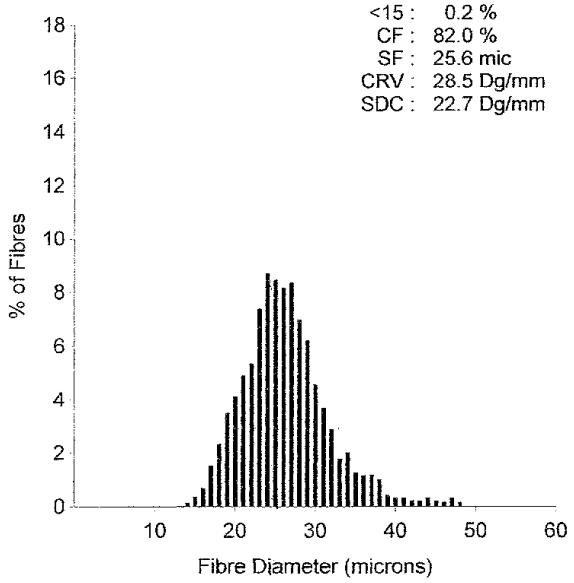
EarTag : 6B46
Micron : 15.8 mic
SD : 3.4 mic
CVD : 21.4 %
CEM : 7.2 mic
<15 : 39.7 %
CF : 100.0 %
SF : 15.5 mic
CRV : 53.0 Dg/mm
SDC : 38.2 Dg/mm



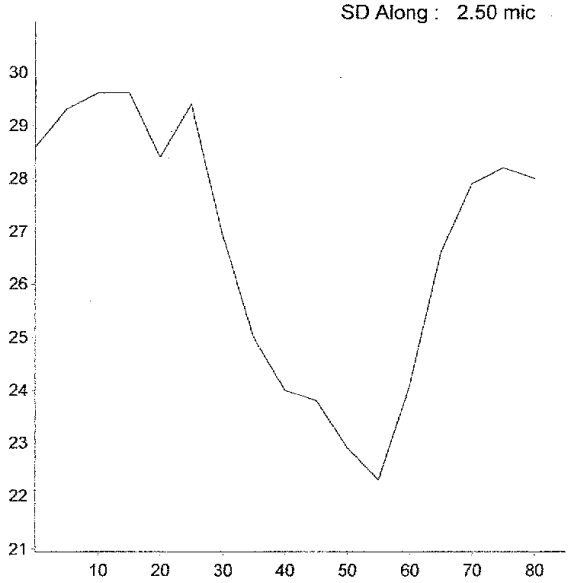
Staple Len : 115.0 mm
Min Mic : 14.7 mic
Max Mic : 16.9 mic
Finest Point From Tip : 20.0 mm
Fibre Ends : 0.5 mic
SD Along : 0.60 mic



EarTag : 6Y40
Micron : 26.3 mic
SD : 5.5 mic
CVD : 20.8 %
CEM : 10.8 mic
<15 : 0.2 %
CF : 82.0 %
SF : 25.6 mic
CRV : 28.5 Dg/mm
SDC : 22.7 Dg/mm



Staple Len : 85.0 mm
Min Mic : 22.3 mic
Max Mic : 29.6 mic
Finest Point From Tip : 55.0 mm
Fibre Ends : 2.0 mic
SD Along : 2.50 mic



Analysis of Two Fibre Test Examples (Above)

Top Example (6B46)

The average fibre diameter is 15.8 micron. As can be seen with the histogram, most of the fibres are centred close to the mean diameter. Almost all fibres are between 9 microns and 28 microns, (range of 19 microns). This alpaca has very low variation of fibre diameter, and consequently has a low SD of 3.4 microns, (2/3 of fibres are between 12.4 microns and 19.2 microns). As all fibres are below 30 microns, the Comfort Factor is 100%.

The micron profile shows a relatively flat profile indicating stable level of nutrition passing to the fibre follicles. The profile shows the average diameter of the fibre staple starting at almost 17 microns at last shearing (left side of profile), then finishing at about 16 microns when the sample was taken.

The results indicate this sample is from a superior animal, capable of producing premium ultrafine fibre.

Bottom Example (6Y40)

The average fibre diameter is 26.3 microns. The histogram shows high variation of diameter of individual fibres, ranging from 13 microns to 48 microns, giving a range of 35 microns. For this reason the SD is 5.5 microns, (2/3 of the fibres are between 20.8 microns and 31.8 microns). Note that the CV is 20.8%, which is lower than the above alpaca at 21.4%. The reason for this is the difference in fibre diameter.

The comfort factor is 82%, meaning 18% of fibres are greater than 30 microns. The fibre from this alpaca would likely have a prickle feel if worn next to the skin.

The micron profile shows the level of nutrition falling dramatically about half way through the growing season, before rebounding to almost its initial diameter. This might be a result of worm infestation, dry conditions or ill health followed by a return to lush or healthy conditions. The fibre would likely be tender at the finest point on the profile.

This alpaca would be regarded as producing inferior fleece by commercial standards.

Micron Blowout

Many growers lose faith in their animals once they receive a test report showing a high fibre diameter result. The fact is, the animal might be capable of producing superfine fleeces, however, it may have been subject to overfeeding.

During 2010, Australian Alpaca Fibre Testing conducted over 40 thousand alpaca fibre tests. The average micron for these tests was 25.1 microns. A high percentage of these tests were on samples from first or second fleeces.

The average range in fibre diameter along the staple was 4.8 microns. This represents how much the fibre changed in diameter over the growing season. This variation is caused mainly by changes in nutritional intake. High nutrition causes the fibre to broaden. Overfeeding high quality hay or grain has often been the cause of much anguish when the fibre test results are revealed.

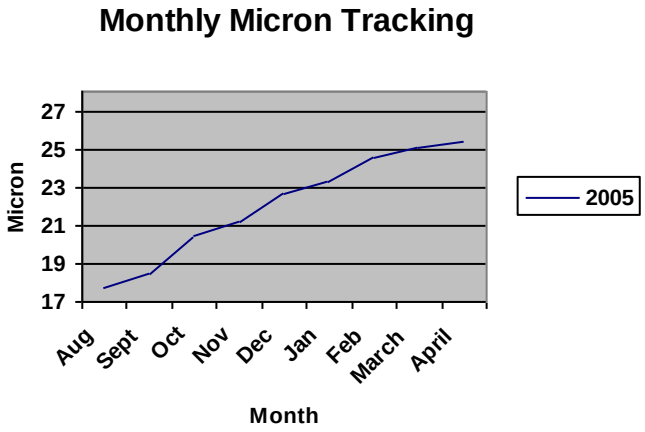
With many of the alpacas we tested, the fibre diameter blew out by more than 10 microns. In one year, an alpaca blew out by a staggering 19.2 microns – starting at 18.1, and finishing with 37.3 microns at the point of shearing.

A random selection of 100 test results from 2006 showed about 20% of fleeces to be under 20 microns at one point, but finished with an average fibre diameter of over 26 microns. If these fleeces met H1 grade as set by AAFL, then at under 20 microns they could have been valued at, say, $27 per kilo. The same fleeces would have been valued at possibly $4 per kilo with their eventual micron result.

If the fleeces had initially met the Ultrafine bale criteria, they might have enjoyed a price of $60 per kilo. In this scenario, the micron blow-out would have resulted in a drop in price of, say, $54 or almost 90%.

Obviously, feeding regimes for pregnant females or developing crias might require high nutrition irrespective of impact on fibre diameter. Furthermore, I'm not suggesting you keep your alpacas just one step away from needing life-support systems to survive. The message is to find the right balance.

Micron Profile showing blow-out of 7 microns over 8 month period.



POINTS TO REMEMBER

- Fibre diameter is generally the most important trait for commercial processing. It is also one of the most heritable fibre traits allowing significant genetic gain over generations.
- To select breeding alpacas, SD (Standard Deviation) is as important as fibre diameter if breeding for quality fleeces.
- When reading fibre test results, look at the SD rather than the CV.
- When purchasing an alpaca, always ask for the SD. If the vender knows the micron, then they know the SD.
- Incorrect sampling technique can have a detrimental affect on the eventual test result.
- Seek the advice of an AAFT technician in order to effectively interpret results (info@aaft.com.au).

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