



SHEEP GENETICS  
WOOL

# Contents

Greasy fleece weight (GFW)	1
Clean fleece weight (CFW)	3
Fibre Diameter (FD)	5
Staple Strength (SS)	8
CV of fibre diameter (FDCV)	12
Staple length (SL)	15

# Greasy fleece weight (GFW)

## What to look for?

Greasy fleece weight is quoted at three ages:

1. Yearling (YGFW)
2. Hogget (HGFW)
3. Adult (AGFW)

## What do the numbers mean?

Fleece weight ASBVs are quoted in percentages. ASBVs are deviations from the average of the animals in the database in the 1990 drop. An ASBV of +20% means the animal will cut 20% more wool than the average in 1990. A ram with an ASBV of +20% will pass half of this benefit onto his lambs, that is +10%.

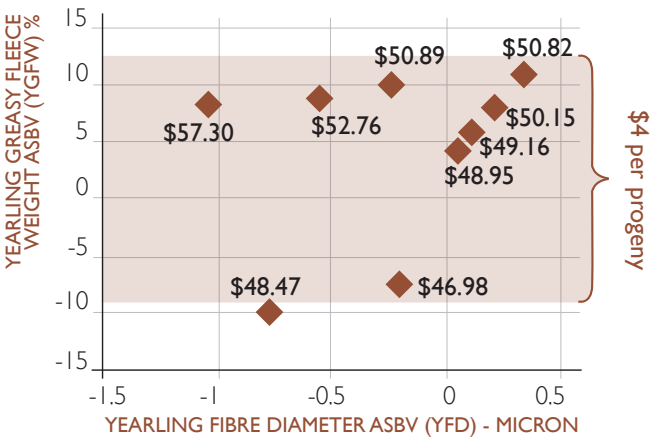
## How is it measured?

Fleeces are weighed by ram breeders at an animal's first or second shearing. For data to be eligible, wool growth must be a minimum of 6 months and the animal must be 10 months of age when shorn.



## What's in it for me?

Each dot represents the YGFW and YFD breeding values of an individual sire. The average fleece value of their progeny at their first shearing is shown. There is a \$4 per progeny difference between high and low fleece weight rams (at the same micron).





# Clean fleece weight (CFW)

## What to look for?

Clean fleece weight is quoted at three ages:

1. Yearling (YCFW)
2. Hogget (HCFW)
3. Adult (ACFW)

## How is clean fleece weight calculated?

Clean fleece weight is calculated by multiplying the greasy fleece weight by the washing yield of a sample taken from the mid-side of the animal.

## Should I select on greasy or clean fleece weight?

Ideally you should select on clean fleece weight because that is what you get paid for. However, clean and greasy fleece weight are closely correlated so selecting on greasy fleece weight is also suitable.

# What else changes if I just selected for fleece weight?

These are what we call correlations, generally if fleece weight goes up:

## THE FREE LUNCHES

Body weight and growth go up

Staple length goes up

## THINGS TO WATCH

Higher fibre diameter (micron)

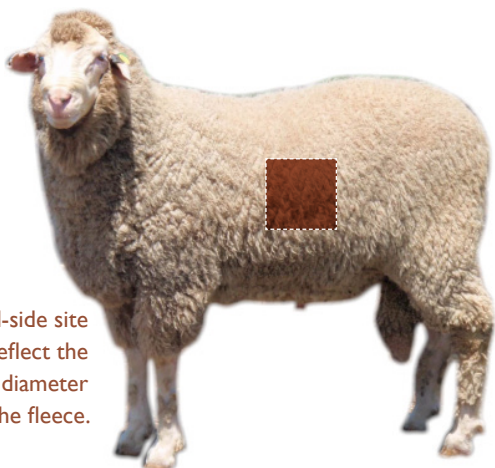
Wrinkle score goes up

Coefficient of variation of fibre diameter gets higher

Fat goes down

Reproduction goes down

**BUT** remember you can manage these correlations by selecting animals based on indexes or a balance of traits that you are interested in.



The mid-side site is known to reflect the average fibre diameter of the fleece.



# Fibre Diameter (FD)

## What to look for?

Wool fibre diameter or micron is usually measured at an animal's first or second shearing. There are three available ASBVs based on the age of measurement:

1. Yearling (YFD)
2. Hogget (HFD)
3. Adult (AFD)

## What do the numbers mean?

Fibre diameter ASBVs are quoted in microns and are expressed as the deviation from the average of animals in the database in the 1990 drop. The more negative the number the finer the animal. An ASBV of -1.6 means the animal will produce wool that is 1.6 micron finer than the average in 1990. A ram with an ASBV for FD of -1.6 will pass half of this benefit onto his lambs, that is -0.8.

## How is it measured?

Breeders collect a representative sample of wool from the mid-side of each animal and submit it to an accredited wool testing laboratory for testing.

### Can I see or feel it?

Yes, feeling the softness of the wool can be used to compare animals with some success but measurement is much more accurate. Traditionally, finer crimping wool was generally finer but bold crimping yet fine sheep are now relatively common.

### What's in it for me?

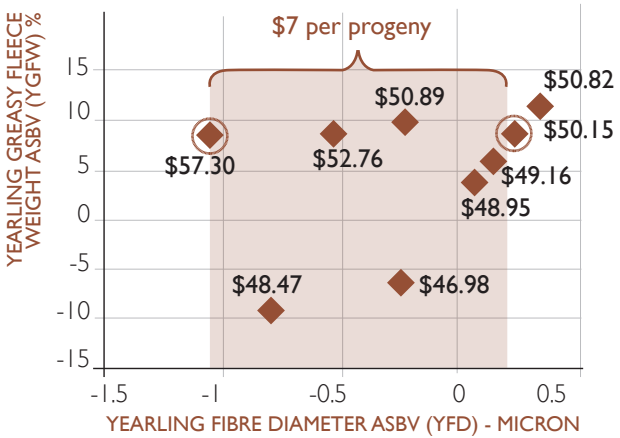
Fibre diameter is a key driver of greasy wool price. Each dot (above right) represents the YGFW and YFD breeding values of an individual sire. The average fleece value of their progeny at their first shearing is shown. There is a \$7 per progeny increase in wool value from the genetically finer ram (at the same fleece weight).

### Is micron all about how you feed them?

Like all traits, there is a large impact of nutrition on fibre diameter. Importantly, ASBVs can separate the genetic part from the nutritional part.







## What else changes if I just selected for fibre diameter?

These are what we call correlations, generally if fibre diameter goes down:

### THE FREE LUNCHES

Comfort factor improves

### THINGS TO WATCH

Lower fleece weight

Lower bodyweight and growth

Staple length goes down

FDCV goes up

Staple strength goes down

**BUT** remember you can manage these correlations by selecting animals based on indexes or a balance of traits that you are interested in.

# Staple Strength (ss)

## What to look for?

Staple strength is quoted at three ages:

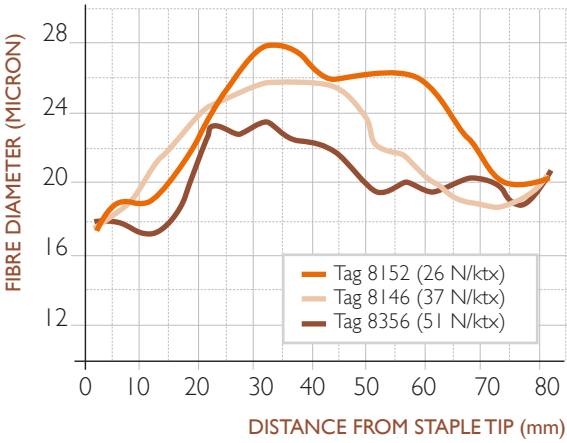
1. Yearling (YSS)
2. Hogget (HSS)
3. Adult (ASS)

## What do the numbers mean?

Staple strength ASBVs are quoted in newtons per kilotex (N/ktex) and are deviations from the average of the database in the 1990 drop. An ASBV of +5 means the animal will produce wool that has a staple strength 5 N/ktex higher than the average in 1990. A ram with an ASBV of +5 will pass half of this benefit onto his lambs, that is +2.5..

## How is it measured?

Staple strength is measured by a machine that holds the staple at the base and tip and measures the maximum force required to break the staple, measured in Newtons (N). Staple thickness is then determined from the weight and length of the staple, this thickness is measured in kilotex (ktex). The force required to break the staple divided by the thickness of the staple provides the staple strength value (N/ktex).



## Can I tell if a ram is likely to have low staple strength?

It is almost impossible to visually differentiate rams on their genetics for staple strength.



## What's in it for me?

Staple strength is an important component of greasy wool price, it accounts for around 20% of the price received for finer wool types. Having sheep that are genetically superior for staple strength will improve wool price.

## Isn't staple strength all about when I shear and how I feed them?

Like all traits there is a large impact of nutrition on staple strength because of the impact that fibre diameter profile has on staple strength. Shearing time also has a major impact and shearing close to the point of lowest fibre diameter improves staple strength. However, within sheep all managed the same way and shorn at the same time, there is large genetic variation in staple strength. Importantly, ASBVs can separate the genetic part from the management part.



# What else changes if I just selected for staple strength?

These are what we call correlations, generally if staple strength goes up:

## THE FREE LUNCHES

Muscling improves

Resistance to worms improves

Fatness improves

Lower CV of fibre diameter

Higher fleece weight

## THINGS TO WATCH

Higher fibre diameter

**BUT** remember you can manage these correlations by selecting animals based on indexes or a balance of traits that you are interested in.

# CV of fibre diameter (FDCV)

## What to look for?

The coefficient of variation of fibre diameter (FDCV) is generally quoted at one of three ages:

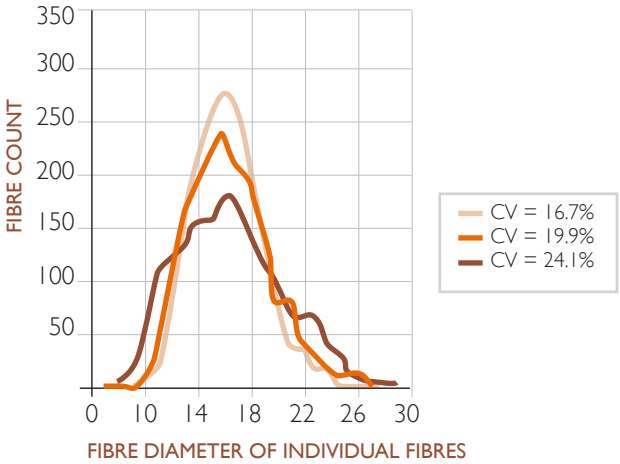
1. Yearling (YFDCV)
2. Hogget (HFDCV)
3. Adult (AFDCV)

## How is it measured?

Coefficient of variation of fibre diameter is a measure of the amount of variation there is between individual wool fibres within a fleece. It is measured on the same sample as fibre diameter is measured.

## What do the numbers mean?

ASBVs for FDCV are quoted in percentages and are deviations from the average of animals in the database in the 1990 drop. The larger the variation in fibres in the fleece, the higher the FDCV will be and the higher the ASBV for FDCV will be. An ASBV of -2% means the animal will produce wool that has FDCV that is 2% lower than the average in 1990. A ram with an ASBV of -2% for FDCV will pass half of this benefit onto his progeny, that is -1%.



## Can I see or feel it?

Low FDCV wools tend to feel softer so you may be able to subjectively tell the difference between extreme wools. However the subtle differences that exist between animals within a flock will generally not be picked up subjectively.



## What's in it for me?

Processors tend to favour wools of low FDCV because of improvements in processing and improved wearability of garments made.

The on-farm benefits of sheep with low FDCV is more likely to come through, reducing the likelihood of fleece rot and therefore body strike.

Research in the 1980's showed that sheep with low FDCV are less likely to get fleece rot and fly strike.

There is also emerging evidence that sheep with a lower FDCV are genetically better able to cope with restricted nutrition over summer and therefore lose less liveweight.

## What else changes if I just selected for FDCV?

These are what we call correlations, generally if FDCV goes down:

### THE FREE LUNCHES

Muscling improves

Resistance to worms improves

Higher fatness

Higher staple strength

Higher growth

Less fleece rot/body strike

### THINGS TO WATCH

Lower fleece weight

**BUT** remember, you can manage these correlations by selecting animals based on indexes or a balance of traits that you are interested in.



# Staple Length (SL)

## What to look for?

Staple length is generally quoted at one of three ages:

1. Yearling (YSL)
2. Hogget (HSL)
3. Adult (ASL)



## How is it measured?

Staple length is measured using the same sample as staple strength. It is measured on a minimum of 10 staples selected from a mid-side sample. Staple length can either be measured manually or by an automated machine. In both cases the process is carried out in an accredited laboratory and the staples are measured in a relaxed state after being held straight and in a standard environment for 24 hours.

## What do the numbers mean?

ASBVs for staple length are quoted in millimetres (mm) and are deviations from the average of animals in the database in the 1990 drop. The longer the staple the higher the ASBV for SL will be. An ASBV of +10 means the animal will produce wool staples that are 10mm longer than the average in 1990. A ram with an ASBV of +10mm will pass half of this benefit onto his lambs, that is +5mm.

## Can I see it?

In sheep in the same mob that have been on the same nutrition you can visually pick those with much higher staple length. However picking subtle differences between most of the animals is quite difficult to detect visually and much better done by machine.

## What's in it for me?

There tends to be an optimum staple length at which wool price is maximised, as both wool shorter than the optimum and longer than the optimum will be discounted. This is generally because processing equipment is set up to handle wool around 80 to 90mm long. However, the finer the wool, the shorter it is expected to be.

# What else changes if I just selected for staple length?

These are what we call correlations, generally if staple length goes up:

### THE FREE LUNCHES

Fleece weight improves

Washing yield goes up

Lower FDCV

Higher growth

Less fleece rot

### THINGS TO WATCH

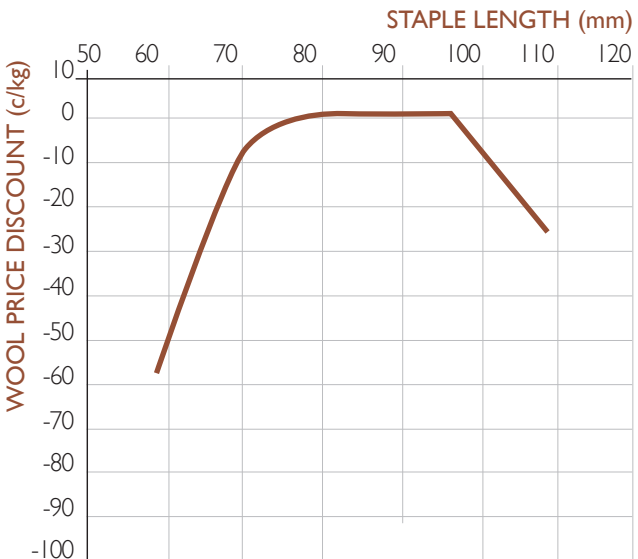
Reproduction goes down

Fibre diameter goes up

**BUT** remember you can manage these correlations by selecting animals based on indexes or a balance of traits that you are interested in.

## So why should I worry about staple length?

Increasing staple length is one of the key ways that fleece weights can be maintained or increased while the amount of wrinkle is reduced. Staple length can also increase fleece value at a lamb shearing, particularly if it results in the wool being combing length. It will therefore remain a priority for some producers. In addition, research in the last decade has shown that there are processing efficiencies to be gained by processing longer staple wools. Eventually growers may receive a price premium for longer staple wools. By careful management and flexible shearing times, producers are able to capitalise on the benefits of long-stapled sheep without suffering over-length discounts.



# SHEEP GENETICS



PO Box U254  
University of New England  
Armidale NSW 2351

**Phone: + 61 2 6773 2948**

**Fax: + 61 2 6773 2707**

[info@sheepgenetics.org.au](mailto:info@sheepgenetics.org.au)

[www.sheepgenetics.org.au](http://www.sheepgenetics.org.au)

## **Disclaimer:**

This brochure is intended as a guide only. Every effort has been made to ensure the information contained within is factual but this cannot be guaranteed.

## **Acknowledgement:**

Meat & Livestock Australia and Australian Wool Innovation acknowledge the matching funds provided by the Australian Government to support the research and development detailed in this publication.

This brochure is based on information from the Sheep CRC publication "Australian Sheep Breeding Values - A guide for ram buyers".



**SHEEP CRC**