



### Introduction

No fixed breed of goat is biologically named cashmere, rather it refers to the under hair or down extracted from the coat of several types of goats. It is produced mainly in central Asia, particularly China. Feral goats in Australia and New Zealand were found to produce down fibres that conform to cashmere specifications, but the level of production from most was low. Current cashmere goats have resulted from screening the feral population, followed by selection to further improve production.

Cashmere is at the pinnacle of the textile fibres. Most cashmere is processed into knitwear, particularly sweaters. Other knitted products include scarves, shawls and underwear. A proportion of coarser cashmere goes into coats and jackets.

### Description

There are arguments about when goat down is cashmere and when it is not. The only official definition is that of the American Society of Testing Materials which states that cashmere is the under hair of goats where the fibres do not exceed 29 microns in diameter. However the main commercial processors tend to place an upper limit for mean fibre diameter of 19 microns on what they consider cashmere.

The main feature of cashmere is its fineness and, associated with this, its softness and warmth for weight. The main producers, China and Outer Mongolia, produce cashmere that is mainly around 15-16 microns in fibre diameter. New Zealand cashmere is generally coarser, around 16-18 microns, but ranges down to 13 microns.

As New Zealand and Australian cashmere is harvested by shearing, there are substantial amounts of guard hair that must be removed at the start of processing. Even Chinese cashmere, harvested by combing, contains a proportion of guard hair. A number of machines have been developed to dehair cashmere and these work best when there are large differences in diameter, length and medullation between the guard hair and down. If differences are small, dehairing becomes slower

and much more down is removed with the guard hair. Consequently, intermediate fibre, fibre between that of down and guard hair, is an undesirable trait.

In New Zealand and Australia, goat down with a mean diameter of 19-23 microns, and some down that is finer than 19 microns but is considered too lustrous to be typical of cashmere, has been given the name **Cashgora**. While there was a brief period of buoyant returns, the recession in the use of animal fibres in 1990 saw the main Cashgora trader drop out of the market. Since then, the quantity of cashgora sold and prices have been very low.

### Fibre Returns

Cashmere is classified according to colour (WW super white where down and guard hair are white; WC white where down is white but guard hair includes coloured fibre; GY grey where down is light coloured with coloured guard hair; BR dark down and coloured guard hair), fibre diameter (1 <16.5 microns; 2 16.5-18.5 microns), yield and length (<30mm down graded).

Cashmere is considered the premium or ultimate of animal fibres and as such was not as affected by fashion changes as much as mohair. Returns are considered to have been relatively constant for 80-90 years, with few of the major downturns in price suffered by wool and mohair. However, supply and demand of cashmere worldwide still has a major impact on cashmere prices achieved in New Zealand.

White is the preferred colour, although there is generally little or no difference in returns for WW and WC fibre. The returns for coloured cashmere are generally about \$20/kg lower than for white cashmere.

A major problem currently facing the New Zealand cashmere industry is lack of volume. Low returns and potentially high goat losses post-shearing have meant that many farmers were unwilling to shear their goats and the on-going uncertainty means many farmers are still not shearing.



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CASHMERE

A major problem currently facing the New Zealand cashmere industry is lack of volume. Slow fibre sales due to low volumes and prices create a chicken and egg situation where fibre does not get shorn to enable saleable lots to attract buyers. On-going uncertainty with fibre sales means many farmers are still not shearing and in recent years been focusing on meat production. The few flocks that have continued to select for improved cashmere traits however continue to make large gains in fibre quality. All white flocks, improved fleece yield and downweight, fine and stable micron show the potential that was theorised in the industries early days.

## Harvesting

In China, selection has produced goats in which the long 'guard hairs' of the outer coat retain the shed down fibres. The down is harvested by combing on one or two occasions in late spring. However most New Zealand goats have short guard hair and tend to lose their down as it moults and moulting patterns of the down fibre are not as regular, making harvesting of the down by combing difficult.

In New Zealand cashmere is generally harvested by shearing the goats before the down moults. Much of the material recovered is guard hair and the yield of down is relatively low. Moulting usually takes place around late winter and early spring but varies throughout New Zealand, earlier in the north and progressively later with the move further south.

As fibre regrowth on goats is not as rapid as in sheep, sufficient feed and shelter must be available for at least 6 weeks post-shearing or longer to avoid high post-shearing death rates.

Although initially goats were shorn standing upright, most goats are now shorn in the same manner as sheep. Other techniques such as combing, which removes the down and leaves the guard hair as protection, or use of a body stocking to retain shed cashmere have been investigated but are not practical for commercial farmers.

## Production Levels

Production from feral goats initially captured was low, at only around 50g of down/year. Subsequent screening of large numbers and breeding has improved the base production level for selected goats to around 200g down/year. The average New Zealand commercial doe flock currently produces around 100-200g down/year, with selected flocks producing 300-400g down/year.

Fibre production and characteristics are influenced by age. Live weight, fleece weight and fibre diameter increase up to 3 to 4 years of age.

Fibre diameter increases by approximately 1 micron from hogget to 2 years of age and fleece weight by around 40-50%. Fibre diameter typically increases by 0.7 microns from 2 to 3 years of age and a further 0.4 microns from 3 to 4 years of age.

Entire male goats appear to grow more fibre than castrates or females. They are however, generally farmed separately for management reasons and are often preferentially fed.

## Breeding Programme

Every breeding programme must start with a set of objectives and these are generally based on economic considerations. Cashmere buyers have set fibre specifications and price schedules that assist in deciding selection objectives which may include increased down weight, reduced fibre diameter, increased yield, reduced intermediate fibre and increased proportion white coloured fibre. Other aims may include increased live weight, improved reproductive performance, and resistance to internal parasites and a reduction in foot problems.

Heritability estimates for the main traits influencing cashmere production are strong (Table 1) indicating that these traits would rapidly respond to selection. However there are unfavourable genetic relationships between the desirable characteristics.

Live weight has small but negative correlations with down weight and down diameter. Another serious problem is the strong relationship between down weight and diameter. Diameter will increase rapidly with selection for high down weight. Conversely,



down weight will decrease with selection for finer. fibre diameter.

**Table 1: Range of estimates of heritability and genetic correlation's for liveweight and fleece traits in Cashmere producing goats**

	Live-weight	Fleece weight	Yield of down	Down weight	Down diameter	Down length
Live-weight	<b>0.22-0.29*</b>	0.09-0.17	-0.20-0.24	-0.13-0.18	-0.06-0.14	0.00-0.31
Fleece weight		<b>0.25-0.35</b>	-0.13-0.39	0.34-0.83	0.12-0.48	0.05-0.27
Yield of down			<b>0.23-0.90</b>	0.74 -0.85	0.33-0.63	0.41-0.78
Down weight				<b>0.36-0.66</b>	0.04-0.77	0.45-0.88
Down diameter					<b>0.47-0.99</b>	0.28-0.52
Down length						<b>0.58-0.70</b>

\* Heritabilities are indicated in bold

\*\* Genetic Correlations

Technology advances have dramatically brought down the cost of screening tests for micron to around \$2. Although there are a few individuals who can accurately assess yield of down or down diameter by eye, visual assessment should be used for screening purposes. It is recommended that sire selection is done from objective measurements and if available index based breeding systems.

One problem is the high cost of fibre testing. Although there are a few individuals who can accurately assess yield of down or down diameter by eye, visual assessment is generally not sufficiently accurate for selection purposes.

The positive correlation between down weight and down length is useful in selection programmes that aim to improve down production. Down length can be used as an indirect measurement of down weight for selection and it is much easier, quicker and cheaper to measure.

A two stage selection method is probably the most effective system for improving down production. All doe hoggets and does are selected on a

combination of down length and live weight. The best 25% of buck hoggets are selected on down length and live weight and reserved for measurement of yield and down diameter and final selection of bucks based on all measurements.

### Cashmere Contacts

#### Growers

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## Processors

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[www.cashmereprocessors.co.nz](http://www.cashmereprocessors.co.nz)

## Fibre Testing

Pastoral Measurements Ltd  
Eugene O'Sullivan, PO Box 18, Temuka  
03 688 5005  
[test@pmlnz.co.nz](mailto:test@pmlnz.co.nz)

Wharepuna Testing  
Alister Frizzel, Kirwee, Canterbury  
03 3181333  
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## Books

Goat Cashmere (2003), New Zealand Cashmere Association  
Simply Goats, Batten GJ, 2000

Both available from:  
Meat & Wool New Zealand  
0800 647000

## References

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