# 5. A Concept of Quality



Figure 1. The picture of a near perfect Angora

## Animal Quality and Breeding

The South Africans talk about "Quality, Quality, Quality!" as advice to the mohair Industry and mohair growers. If the objective of farming mohair is to be achieved, there is little doubt that it should be the best mohair and the most valuable mohair which should be produced.

The problem is that everyone seems to have a different idea about what quality is and what type of animal produces it. Ultimately, the best stock to farm is the stock which returns the most profit. That is, the combination of value per kg, cut per head, and efficiency (or cost of production).

It has always been a mystery to me as to why supposed experts almost universally rely on **visual appraisal** rather than **measurements** and **values** to define both mohair quality and **breeding objectives**. I suppose there is some logic to the often-expressed belief by South African breeders that you should not pack too much mohair on animals because they won't be able to sustain heavy fleece growth under stress and desert conditions. This, perhaps, comes from years of experience and observation of production in the Karoo environment. But I must question this approach. Surely the best returns (under any specific environmental conditions) still come from the combination of cut per head, price per kg and efficiency – why not measure it and breed for it? If you have to cull animals which breakdown under adverse conditions, so be it and anyway, this should show up in the measurements.

Perhaps the only provisos are that it takes considerable effort to measure and analyse production; and that the market always fluctuates (especially in the time frame required to establish concepts of value and gains in measured characteristics). The answer maybe that this is not an exact science – or maybe the participants don't consider it an exact science. Small, isolated and "artisan based" industries might not be expected to embrace technology. Indeed, much larger industries have had similar difficulties as well.  So where is the boundary and when do we change from accepting traditional culture to adopting technically advanced ideas? Of course, NOW; but that might not be readily accepted by conservative or traditionally oriented people. Whatever, it's about what works and perhaps you have to prove it first. Maybe it's about art vs science but I would rather see it as art plus science or even science plus art. If you don't measure and record, how do you know what progress you are making?

It is dangerous trying to ascribe motives and describe other people's ideas.  To make a comparison: the **Texans mohair growers** appear to think in terms of total value and how to extract that return from both the market and the USDA. This comes from a considerable history of subsidy, political pressure and initiatives including subsidised loans based on supposed value of stockpiles. **Africans growers,** on the other hand, have taken a somewhat different approach. While acknowledging market variation and a possible need for short term market support, local processing and active promotion, a concept of visual "**prettiness**" (and uniformity) seems to dominate their thinking and this has obviously been a means of developing and promoting their industry.

It is surprising to recognise that both approaches have been something of a rear-guard action. For many reasons, the total world production of mohair has declined from something like 30million kg in 1966 to a little over 5million kg in 2013. This is a huge reduction in anyone's terms and should raise the question of sustainability into the future.

Getting back to the issue: - The Texans seem obsessed with government support which is surprising given the Republican "free market" bias in the state. Africans seem equally obsessed, but favour visual "quality", which seems to revolve around uniformity of lock type and visual fineness irrespective of fleece weight.

Australia seems to have followed the South African **character and style**, **ringlet** and **uniformity** arguments. No doubt the South African strain of Angora shows superior conformation and faster growth. However, Australia lacks the labour and history of classing as well as the scale and number of properties which would allow the marketing of grower lots of meticulously classed lines of fibre which would, in turn, convince buyers to offer higher prices for "superior" fibre. Such top market prices reward African buck breeders with much sought-after animal sales.

The photos on the following pages demonstrate the methods used in South Africa to institutionalise the visual quality of Angoras and mohair.

# The traditional concept of quality.



Figure 2. Entry display at Snyberg. Freshly washed Bucks show off.



Figure 3. Two sequential dips allow washing and rinsing at Snyberg



Figure 4. The five syndicate judges confer at the 2009 Expo

**Figure 5. Judges often come from the field staff of two major brokers**



**Figure 6. Judging the teams event with each judge examining each animal then conferring for a decision**



**Figure 7. In recent years selection has resulted in each age class looking surprisingly similar**

**Figure 8. Competition for top prices at sale results in meticulous sorting**



**Figure 9. Larger grower lots displayed for sale with test information**

The South Africans are not alone in this concept of quality, though Australian producers seem reluctant to come anywhere close to the effort required to present visually attractive and uniform structured fibre to the market. Australians appear to favour visual appearance at shows and sales as a "measure" of quality but seem to be rather reticent to back their opinion by bidding at public sales, preferring (apparently) to buy stock direct from favoured "politically acceptable" studs who have a record of winning at shows.

It also seems that not all show success brings sales. To some extent it depends on the perceived ability of the judge(s). One might also suggest that a judge's perception of quality might be questioned because they seem to follow popular opinion as well.

So, what does the "industry" view as quality? Dare I venture to characterise the market as desiring clear, fine (or narrow) pencil locked and structured fleeces, often overgrown by the time of the show or sale and tending towards the winners of broad ribbons. To be fair, such animals seem to exhibit both uniformity of lock and lack of medullation, particularly along the backline. While I would add size and bulk of fleece, this is somewhat variable and may be overshadowed by blood line or preparation expressed in the washing and **preparation** of the animal. This may well be related to **housing** and over feeding for considerable periods.

The trend in South Africa is somewhat away from shows but towards success in mohair fleece competitions and record mohair sale prices. The mohair buyers seem to take a role in defining quality (and uniformity) but they too, have been attracted to "pretty and visually outstanding" lines of fibre.

The one outstanding feature which is rarely considered is **fleece weight**. Of course, this cannot be measured until shearing and even then, requires correction to 6 months growth for valid comparison. There is still the issue of over-feeding which tends to increase body and fleece weight and washing and other staple manipulations which might reduce fleece weight but improve lock structure.

It has only been in recent times (since 1999) that measured characteristics have been included routinely in mohair sale catalogues. Buyers still express concerns about the accuracy and helpfulness of measurements. Of concern has been the apparent adoption of referring to visual fineness in micron terms. For example, a buyer may make a claim on the broker stating that sorting produced x% of (say) 30um fibre from a line measured (or even just branded) KID fibre, without a measurement of the out-sorts to back up the claim.

So, to a large degree across the world industry, quality is still in the eye of the beholder. This may be fair to some extent because the Angora breed is still quite variable and there are a number of quality traits with little by way of technique to integrate them into an agreed standard. Again, this might not really be surprising since Angoras are run by many growers in many varied climatic conditions and with breeding stock from many sources.

## A Story from the Stud Merino industry.

> "A ram breeder has 100 STUD Rams to sell. He gets the mob in for the first buyer and recons there are 10 "really good" rams in the mob and sells them to the buyer. The second buyer comes to look at the remaining 90 rams and the breeder recons there are 10 "really good" rams in the mob and sells them to the buyer. The third buyer comes to look at the 80 rams in the mob and the breeder recons there are 10 "really good" rams in the mob and sells them to the buyer. . .. . The tenth buyer comes to look at the remaining 10 rams in the mob and breeder recons there are still a couple of "really good" rams in the mob."

Two points. The first is that subjective assessment is relative. In any group, there is variation and the "best" ones stand out relative to the group. The second is that everyone has a different idea about quality, so it may well be that the buyers simply have different requirements (but I would not bet on it!)

## Misconceptions about how genetics work

It is my contention that Australian Angora breeders, like many animal breeders fail to understand **population genetics**. Everyone looks to find the perfect outstanding individual animal and believes that, if it can be found it will have a profound effect on its progeny. It does not work like that. It's not like a Poker Machine which occasionally produces a jackpot. No individual animal carries all the good points, and even if it did, it will not pass them all to its progeny. Success at breeding is achieved by the gradual accumulation of genetic characteristics by continued selection for those characteristics in both males and females over generations.

There are several consequences flowing from an understanding of this. One is that there is no point (in genetic terms) in paying vast amounts of money for a spectacular animal. (There may of course be financial benefits in terms of prestige and promotion for such an outlay.)

Another is that a breeder needs to be very clear about what he wants to achieve and choose the selection techniques which will best achieve what he wants.

Following from that, the breeder must work on both buck and doe selection using the same criteria.

A misconception from the past is that of males being "**pre-potent**". That is males, particularly spectacular males, pass on more than 50% of their superiority (or genes) to their offspring. Absolutely not true. If anything, (and there is very little evidence for this), it's the females which have an edge here because they pass on **mitochondrial DNA** to their offspring.

In modern genetic terms, what actually happens is that a portion of the degree of superiority (or inferiority) from both parents is passed to the offspring so the outcome is half the superiority from each parent multiplied by the heritability of the trait. This is the sum of half the **Estimated Breeding Values (EBV)** of each parent PLUS an **Error Factor**.

The Error Factor is important because it explains why we still can't predict the performance of a progeny of a particular mating with any great accuracy. Only over large numbers of progeny can we begin to see a trend which confirms the effect of selection.

## Systematic visual evaluation

There are 4 methods of visual assessment of stock. The first is quite traditional in the Merino sheep and wool industry.

1. **Animal classing** often, but not always, was left to a professional classer who examined stock in a race and indicates a cull status for each animal based on the percentage to be culled as requested by the owner. In the case of ram breeders, the race may well be divided by gates to allow each ram to be examined a number of times when the selection process reached a final stage. Ram selection may start with hundreds of animals and result in a small group of "reserves" for home use and then several larger groups which might be offered for sale, either on property or at a public auction. The technique is sometimes used in Angoras but numbers in

mobs are rarely sufficient and practitioners (classers) are not available. However, there is no reason why the owner or an experienced breeder cannot carry out such classing.

This approach would seem a reasonable option for farmers who run a traditional flock of Angoras and who wish to follow the current concept of producing mohair with good visual character and animals which are visually attractive. It is unlikely to change the performance or returns from mohair though some concern is raised if selection and purchases involve very **fine fleeces**. Such choice might reduce **fleece weights** and **fleece length** which may not be covered by premiums for finer mohair. Selection for fineness alone may also reduce animal size and vigour.



**Figure** 10. **Systematic animal assessment in South African flock competition**

**Figure 11. Assessing lock structure**



2. The **SRS (Soft Rolling Skin)** technique is a commercialised technique under a trade mark requiring the payment of a "membership" fee to be let into the "secret" and to be granted permission to use the label on stock complying with the principles of SRS. "**Coiling and bundling**" of fibres from the skin seems to be the major part of the assessment. **Coiling** is somewhat subjective and seems to involve narrow pencil locks and fine handling mohair with high lustre. **Bundling** can be seen and seems to result from uniform fibre growth from whole follicle groups (such groups cover about 1 square mm). It is claimed that animals with those characteristics are more even with well organised follicles of uniform depth and so perform better.

The author undertook a classification process, paying two SRS classers to examine his young stock in 2001. The process involved scoring each animal on 4 scales out of 5 (handle, lustre, coiling and bundling) and adding the results. In the Cudal flock, no animals were considered high scoring enough on the scales to deserve the SRS label – the highest scores only reached 14/20. Later analysis found that the individual scores were correlated between themselves (so perhaps not adding to the accuracy of classification as might have been hoped), that higher scoring animals did not have finer (measured diameter) nor heavier fleeces as seemed to be claimed as the result of SRS breeding. While it was claimed that there were no compliant SRS animals in the mobs the practitioners appeared not to understand the concept of **regression** (which would

argue that the higher the score the closer the compliance would be) and did not accept that higher scoring animals should at least go some way to demonstrate claimed effects. Perhaps of some interest was that softness (handle) scores produced inconsistent results when tested against measured micron which was a little surprising.

Unfortunately, the publishing of these results resulted in legal issues with the exchange of solicitors' letters and the acceptance by the SRS group that the attachment of the trade mark symbol is only required if a claim is made on the product for which the trade mark is registered. So, I don't have to use the trade mark symbol when I refer to SRS in this book, though it is polite to mention that the concept is covered by trade mark regulation. The inspectors withdrew from further studies which might have shown some objective results from applying the concept.

There is some evidence from sheep studies that any systematic effort to select stock has a positive impact on performance. However, it is important to use the same assessment process for both does and bucks. Doe selection only will be smothered by the performance characteristics of the sires. There seems to be a number of inconsistencies between the claims of the practitioners and actual animal performance and there are no reliable data on which to determine the outcomes of SRS breeding techniques.

3. **Weaving mohair inspection.** Unlike the SRS concept, the weaving mohair classification (pink compliance tags) is associated with a mohair marketing initiative to back its claims. In some ways, the weaving mohair scheme is a **market assurance program** guaranteeing the quality of the product to buyers with the objective of achieving higher returns for the mohair.

Perhaps there are two points which need to be made about inspections. First, they are expensive and hard to apply universally, especially over an extended period and across extended distances. Secondly, we must be careful not to allow one person to dominate the "type" over an extended period. After all, it is only one person's opinion and we really don't want to stifle variation from which genetic gains might be made especially in varying environments.

The counter argument might be expressed in terms of more experience being shared with farmers and in the matching of mohair to a better market.

Weaving type mohair is a concept espoused by GT Ferreira who has had considerable experience advising and negotiating with high value processors and weavers in Europe. He has developed a market and a concept to supply it which is somewhat ahead of the general market available in Australia.

Here the old concept of **spinning types** vs **top makers types** can be seen. Top makers have a wide range of equipment and have

Figure 12. GT Ferreira doing Weaving Mohair inspection

markets to handle a wide range of fibre types with varying degrees of faults. Spinner's types generally better quality that can be processed more easily and probably with a higher specification and value. Weaving mohair, as is being claimed, is a range of Spinner's types targeted at the high end of the market in Europe (and Japan). The market is for suiting materials and high-quality knitwear. The weaving type requires four characteristics:

- Length,
- defined micron,
- freedom from pigmented fibres
- very low medullation levels.

A further concept talked about is referred to as "**workability**". This term seems to involve a high spinning yield (kg of yarn/kg of raw fibre) which relates to a minimum of short fibres lost as **noils**, high **tensile strength** (lack of tenderness), and lack of poor dying **medullated fibres** referred to as kemps.

The claim, which seems to be backed up by processing results so far, is that these desired characteristics can be gauged in live animals largely by examining the fibre on the ears and face. It seems that what is required is firstly, lack of pigmented fibres and, secondly, a soft velvet fibre



**Figure 13. Weaving mohair inspection. Silky ears and face with no pigmentation get a pink tag of approval**

rather than broad and chalky coverage on the skin. Some additional evidence may come from plucking fibre from the backline to examine the fibre for kemps. Animals with these characteristics are tagged and the fleeces subjected to micron testing and classing based on clarity of style and a length measurement of over 12.5cm. There is a suggestion that "**super weaving**" types may develop from breeding these animals with the inclusion of a fibre drawing process to examine how much short fibre remains after long fibres have been drawn out of the staple.

Weaving mohair comes from the first three shearings with a top micron limit of 31-33um. For top quality suiting materials, a maximum of about 26um seems to apply. The difficulty comes in

achieving the 12.5cm length without changing the shearing interval with the following fleeces falling into the "short" lines which would bring a discounted price.

As with most **QA** (quality assurance) schemes, the concept of weaving mohair production relies on achieving a better-than-traditional price with limited additional costs. The weaving mohair initiative appears to offer a means of increasing income from mohair production by reaching a specialised high value market. The technique seems to be independent of traditional performance characteristics such as fleece weight and fibre diameter. The method seems only to apply to younger animals though the forth shearing may be included from finer flocks if efforts are made to ensure sufficient length. Delayed shearing (longer shearing interval) may be required and this may impact on both shearing practice and the shearing of short fleece.

4. **Routine scoring.** This is a more subjective method of systematic inspection aimed at selection of animals of a type considered more desirable by the breeder or farm producer. It simply assumes that there is some relationship between visual appraisal and both mohair quality and animal productivity. In some ways, it is very similar to animal classing, but the objective is to score and describe animals on appearance, possibly to back up measurements and match visual appearance to what is thought to be an attractive type for animal sales. Such efforts may be made for selection of breeding stock either for replacements or sale. The advantage is that the scores offer some means for tracking progress in the herd.

   The technique may involve scoring and recording ear pigmentation, coverage, size and fibre class both of the neck and the whole fleece. Scoring might be done at crutching, pre-shearing sampling, or at shearing. However, such recording does require careful collection of data so will probably incur a cost and it is important to have a clear purpose for the work. There is no point in recording data if it's not going to be used.



**Figure 14. Brown skin pigmentation with no black seems to be favoured**

**Figure 15. Black skin and worse, black fibres are regarded as serious faults and exclude a weaving mohair tag**



Scores for head and neck coverage 3 to 5+. Pigmentation 0:0 for no skin or hair pigmentation to 3:3 for bad colouration and large amounts of pigmented fibre. (The ears above would be 0:0 and 2:2.) Class neck and Mid side eg FFH/YG or K/K. You can even use stars for superior appearance.

(Continued in next file)