

Going into Goats

Module 10

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Mohair production



Image: AgriFutures

An introduction to the mohair industry¹

Mohair is the fleece produced by Angora goats. The origins of the Angora breed can be traced to the Himalaya Mountains of Asia.

The breed was introduced to Australia from France in the early 1800s. However, the most significant genetic input to the Australian Angora has come from South Africa and Texas.

Today, South Africa is the largest mohair-producing nation, accounting for over 60% of the world's mohair clip. The United States of America is also a significant producer of mohair. Australia is currently only a small player on the world scene, contributing less than 5% of the world total.

The characteristics of mohair that make it a sought-after fibre are lustre, soft handle, strength, elasticity and low felting properties. Mohair is very durable, easy to clean, flame resistant, has a very high affinity for dyes and possesses both insulating and sound absorbance properties.

With these qualities, the fibre lends itself to a broad range of uses. Mohair generally falls within the fibre diameter range of 23–38 microns. The finest fleece is grown by young kids, with fibre diameter increasing as liveweight increases. At the finer end of the scale, mohair is used in fashion knitwear and suiting. As the micron increases, the fibre finds different uses including coating, accessories and soft-furnishing manufacture. The skins can also be used in the production of leather goods.



What to do

In a mohair enterprise, the four key elements of knowledge and skill that a producer should seek to develop are as follows:

1. Know and understand the specifications of your product.
2. Know how to produce mohair efficiently.
3. Know how to harvest mohair effectively.
4. Know how to market your product successfully.

How to do it?

1. Product specifications

The income from a mohair clip is based on the combination of fleece quality and quantity, which is largely determined by breeding and management.

Mohair is valued in dollars per kilogram (\$/kg) of greasy fibre. The factors which influence price are primarily fibre diameter (fineness) and length, and to a lesser extent style, lustre, character, colour, medullated fibre and fault (contamination).

◆ Quantity

Individual fleece weight, yield (amount of clean fibre) and number of fleeces are the factors which determine the quantity of fibre produced by an enterprise.

Breeding and management will influence the quantity of fleece produced by an individual goat and the yield. Yield refers to the post cleaning weight of fleece, i.e. usable product. During the cleaning process, grease, vegetable matter, dust, contaminants and short/broken fibres are removed, reducing the fleece weight. Yield is expressed as a percentage of the greasy weight. The higher the yield, the lower the losses during processing and the more valuable the product.



Intensive cleaning processes, such as carbonising to remove heavy vegetable matter or lengthy scouring to remove excessive grease, are expensive and can damage the fibre. The requirement for such treatments will significantly devalue the fleece.

Length of fibre is an integral part of the quantity equation and has implications for the end use of the product. Mohair is classed into four categories in descending order of length: A, B, C and D – see table below.

The buyers' preference for fibre length is influenced by trends in fashion and the intended end use of the product.

The timing of shearing will influence fibre length. Mohair growth is rapid, approximately two centimetres per month, and Angora goats require shearing at six monthly intervals². Fibre growth is influenced by day length and animal nutrition, with the rate of growth increasing as day length and/or the feed supply increases and vice versa. As a consequence, winter fleeces tend to be naturally shorter than summer fleeces. It should be noted that over-long fleeces are more prone to entanglement, vegetable contamination and stain.

Fleece type			
Length category	Kid	Young goat	Adult
A	length 12.1–16cm	length 13.1–16cm	
B	length 10.1–12cm	length 11.1–13cm	
C	length 6–10cm	length 6–11cm	
D	less than 6cm	less than 6cm	
Greater than 16.1cm	Overlong fleece incurs a significant financial penalty when sold commercially. However, it is sought after in craft markets and, in small quantities, can bring a premium price.		

◆ Quality

Fleece quality relates to:

- fibre fineness
- lustre
- style and character
- strength
- fleece uniformity
- presence of medullated and kemp fibres.

Fleece quality is largely influenced by breeding.

Fineness – The fineness of a fleece refers to the average fibre diameter and is measured in microns. In general, the lower the micron the higher the fleece value.

The Australian Mohair industry is breeding toward larger framed animals with finer fleeces that are suitable for a wide range of climatic zones. However, there is also a tendency for finer fleeces to trap more vegetable matter, so careful management is required to reduce the incidence of vegetable fault. Further information is provided later in this module.

Lustre – Mohair fibres have a distinct lustre that is highly desirable. This characteristic relates to the reflection of light from the surface of the fibre and is a function of the closed arrangement of cuticle cells or scales. Whilst a high quality fleece has a soft bright sheen, a poor quality fleece will appear dull and lifeless.

Style and character – These two properties give structure to the staple. Style refers to the twist or ringlets in the fibre. Character describes the waves or crimp in the staple. A balance of style and character within the staple is preferred and should be consistent across the fleece. Poorly defined twist and crimp can result in a fleece that appears either flat or ropery.

Strength – Staple strength is measured in terms of the pressure required to break the staple and is quoted in Newton per kilotex (N/ktex). The Australian Wool Testing Authority Ltd quotes a figure of 41 N or above as generally being considered ‘sound’ in the wool trade³.

Fleece uniformity – The predictability of processing performance is enhanced by uniformity of fibre traits across the body of the animal. Uniformity is highly valued by buyers. In the shearing shed, the more uniform the fleece, the less skirting is required.

Medullated and kemp fibres – Medullated and kemp fibres are irregularities that can occur in Angora goats and are highly undesirable. These irregular fibres have a chalky white appearance, exhibit poor dye absorption and are coarse and less resilient than normal mohair fibres⁴. Kemp fibres are short and thick, whereas medullated fibres are quite long.



Detailed feedback about fibre diameter, length and yield is provided by the broker on all full sale lots supplied from a single property. If there is insufficient fleece to make up a sale lot, similar fleece material from multiple properties will be combined. In such cases, detailed feedback about a particular property’s fleece cannot be provided.

Accredited fleece testing services are provided by organisations such as the Australian Wool Testing Authority Ltd. Fleece samples can be sent away for testing or mobile testing units can be used on farm. Such services can provide quantitative information about fibre diameter, length and washing yield.

Feedback on your product specification is essential for you to determine how well your product aligns with the demands of the end user and to assess the progress of your breeding program and farm management activities.

◆ Animal specifications

Animal selection and breeding has a significant influence on fleece weight, yield and quality. It is important to know your product and focus on those traits that will improve your mohair income. It is also important to select/breed a goat that is physically sound, robust and fertile. *Module 5 – Goat Selection* explores the subject of goat selection in detail. A summary of the key selection criteria for Angora goats is presented below:

» Frame

- robust animal
- structurally sound legs and back
- well sprung ribs
- consider meat production traits to add value to culls. Mature culls will be sold into commodity meat markets. Surplus young goats, 12 weeks to 12 months of age, may be able to be sold as capretto or chevon. For more information on meat product specifications refer to *Module 8 – Marketing* and the AUS-MEAT website (ausmeat.com.au). Some angoras are smaller framed and slower maturing than the meat breeds and may remain within the specifications for capretto and chevon for longer.



» Feet

- sound, well-structured feet
- consider the environment in which the goats will be run. Rocky environments will keep feet in shape. In wetter climates, where there is an absence of rock, foot trimming may be required.

» Mouths

- sound teeth
- well-formed jaw – not under or overshot.

» Horns

- for ease of shearing and to reduce the risk of fighting injuries, horns should not be positioned too close to the head (aim to have horns bending downward, away from neck line), nor should they be too widely spread
- horns should not be too close together on the head
- trim horn tips to reduce the risk of injury to handlers and other goats.



» Fertility

- ease of kidding
- normal genitalia
- in a broad acre grazing situation with low levels of supervision at kidding, there is a preference for single births. During pregnancy and lactation, an Angora doe is also growing fleece, which requires additional energy
- in more intensively managed enterprises, multiple births are less of a concern and may be actively encouraged through genetic selection and nutritional management during the reproductive cycle. Does rearing multiple offspring have increased nutritional

requirements and thus require extra feed. Careful monitoring and intervention as required at kidding will help to increase the survival rate of multiple births. The benefits of increased management and feed inputs are more offspring and more high value kid fleece. An example of such a system is presented in Rowena Doyle and Bob and June Liddy's case study which appears in the toolkit at the end of this module.

» Fleece

- dense, uniform fleece across the body
- absence of medullated and kemp fibres
- lustrous fleece
- well defined and balanced style and character
- acceptable levels of grease – excessive grease or dryness is undesirable⁵. Grease protects the fibre from weather and ultra violet radiation. Mohair fleece has substantially less grease than merino wool⁶. Yields of 75%–85% are common. Excessive dryness can result in a perished fibre tip, which reduces fibre length. Varying fibre length within a staple will give the staple a tapered, 'tippy' appearance, reducing its processing value
- ability to maintain fleece – no fibre shedding
- no pigmented fibres should be present on fleece bearing areas of the body. Coloured fibres have the potential to contaminate the fleece.



2. Mohair production – feeding and management

Module 6 – Husbandry and *Module 7 – Nutrition* address the topics of feeding and goat management for meat goats. Much of the information presented in these modules is equally relevant to Angora goats. As you read these modules, please note that most mohair enterprises would fall into the category of an Intensive system. In the introduction to this manual, intensive enterprises are defined as follows; “enterprises operating in more temperate environments, where inputs are often higher and pastures dominated by improved/exotic species”.

However, there are some management considerations, which apply specifically to Angora goats and mohair production systems that have not been covered in the earlier modules. These issues will be addressed in the following section.

The annual production schedule for a mohair enterprise is summarised in the calendar which follows.

The calendar has been designed to allow you to alter the monthly schedule to suit your farm business. The relative positioning of the management actions is fixed, but you may wish to slide the calendar months up or down to suit your situation.

Note: The items written in plain font are considered to be necessary actions, those in italics should be undertaken as required depending on farm circumstances.

Months – your farm	Months – example	Management actions
	January	<ul style="list-style-type: none"> • crutching • wiggling
	February	<ul style="list-style-type: none"> • wean kids on to fresh paddock(s) • vaccinate kids* (see <i>Module 6 – Husbandry</i>)
	March	<ul style="list-style-type: none"> • shearing • classing fleece • <i>fleece recording – records may include: individual fleece weight, classing details and desirable/undesirable traits exhibited by the fleece or goat. Mid side sample for individual fleece testing.</i> • drench all goats to control internal parasites[#] • vaccinate mature goats* (see <i>Module 6 – Husbandry</i>) • provide access to shelter off-shears • cull excess breeders and maidens • buck selection • <i>lice treatment[#]</i> • <i>supplement with trace elements</i>
	April	<ul style="list-style-type: none"> • provide access to shelter off-shears • deliver mohair to broker or mohair sale • increase feed supply pre-joining
	May	<ul style="list-style-type: none"> • joining
	June	<ul style="list-style-type: none"> • crutching • wiggling • <i>foot trimming</i>

Months – your farm	Months – example	Management actions
	July	
	August	
	September	<ul style="list-style-type: none"> • shearing • classing fleece • <i>fleece recording – records may include: individual fleece weight, classing details and desirable/undesirable traits exhibited by the fleece or goat. Mid side sample for individual fleece testing.</i> • drench all goats to control internal parasites[#] • lice treatment[#] • vaccinate mature goats* (see <i>Module 6 – Husbandry</i>) • provide access to shelter off shears • control predators • prepare kidding paddocks, focusing on shelter, safety, feed and water supply
	October	<ul style="list-style-type: none"> • provide access to shelter off-shears • kidding • <i>kid recording – records may include identification number, sire, dam, birth date, type of birth and birth weight.</i> • increase feed supply to does, and ensure that does and newborn kids are well sheltered • control predators • deliver mohair to broker or mohair sale
	November	
	December	<ul style="list-style-type: none"> • marking • identification tagging of kids – if not tagged at birth • drench all goats, including kids, to control internal parasites (the timing of this procedure may vary depending on climatic conditions)[#] • vaccinate kids* (see <i>Module 6 – Husbandry</i>)

* In some circumstances, vitamin B1 (thiamine) may be given as an additional injection when vaccinating. Green pasture usually provides sufficient quantities of vitamin B1. However, if stock do not have access to green feed, deficiency may occur, and therefore an injection of vitamin B1 may be beneficial. For more detail about vitamin B1/thiamine deficiency refer to *Module 7 – Nutrition Toolkit*, page 17.

[#] Parasite control treatments should be administered to all goat classes at the same time, thus reducing the risk of cross contamination should stock from different mobs get mixed together. More information about parasite control and prevention is presented in *Module 9 – Parasite Control*.

◆ Feeding for mohair production

While it was stated earlier that the major influence on mohair quality is genetics, the role of nutrition needs to be acknowledged.

There is a direct correlation between liveweight and fibre diameter. As liveweight increases, fibre diameter increases and vice versa. Therefore, management, in terms of stocking rate and nutrition, has an important role to play.

The influence of nutrition on fibre diameter can also have implications for staple strength. Fibre diameter will vary along the length of a fibre in accordance with the level of nutrition. A rapid change in the nutritional status of the goat, caused by either a significant variation in feed supply or changes in the metabolic requirements of the animal, will cause variation in fibre diameter. Extreme variation in fibre diameter within the staple may translate to a point of weakness (tenderness), with the potential for a break to occur. Tenderness reduces the processing potential of the fleece. Tenderness is not common in mohair.

Poor nutrition will result in inferior fleece production in both quality and quantity.

One of the most challenging aspects of a fibre production enterprise is the management of the doe flock. The greatest nutritional demands are presented by pregnant and lactating does. During this time, the energy requirements of the doe are particularly high. Careful planning and pasture/feed management are required to fulfil the doe's nutritional requirements. This can be difficult to achieve and it is during this period that the impact on fibre quality and quantity will be most marked.



“Angoras are particularly responsive to feeding; they are an amazing fibre growing machine.” – Roger Clark, Boorowa, New South Wales

A well-bred animal can only fulfil its genetic potential for mohair production if it is supplied with the appropriate nutrition. If an animal is not being fully fed, the quality and quantity of mohair produced by that individual will be limited. In such cases, improvements to the feed supply will increase fibre production. Whilst increased nutrition will increase fleece weight, it is also likely to cause an increase in fibre diameter, both of which will have implications for the value of the clip. Decisions about feeding for fibre production need to be made with careful consideration for the

potential financial return. It is important to do your sums, factoring in the following items:

- cost of extra feed
- price discount for increased fibre diameter
- income gain from increased quantity and improved quality.

The cost and practicality of feeding to achieve certain production levels also needs to be carefully considered when purchasing stock. The fleece production figures quoted for sale goats need to be tempered by the level of nutrition supplied to achieve those results. Are you prepared or able to feed to achieve similar production levels? Are you willing to accept lower levels of production?

In deciding whether or not to feed livestock, animal welfare and the nutritional requirements of the animal should be the primary consideration.

Another factor to consider in managing the nutrition of your animals is the impact on the next generation of kids. Nutrition levels of the doe during pregnancy and early lactation will impact on the mohair production of their offspring. Poor nutrition during these critical periods can adversely affect fibre quality over the lifetime of the progeny. Interactions between mid-pregnancy nutrition and lactation nutrition have been shown to influence the follicle development, fibre diameter and fibre length of kids⁷. Nutrition during lactation was also shown to impact on the growth of medullated fibres⁸.



Image: AgriFutures

◆ Management to increase weaning percentage

Weaning percentage is defined as the number of kids weaned as a proportion of the number of does joined and will vary according to the intensity of your management system at kidding. In a system where kidding is highly supervised, which may include shedding or yarding, frequent checking of animals and birthing assistance as required, weaning percentages of 120–130% are achievable. With average levels of supervision and intervention, expect a weaning percentage of 60–75%. In a broad acre situation, with minimal supervision or predator control, weaning percentages of 30% are realistic.

» Tips to help increase weaning percentages:

- Select kidding paddocks with sufficient feed and water to support lactating does so that supplementary feed is not required. Feeding supplements is a disturbance which should be avoided during the kidding period.
- Schedule kidding to coincide with periods of the year when there is sufficient paddock feed to meet the increasing nutritional demands of lactating does and growing kids.
- Ensure that kidding paddocks are well sheltered to protect does and newborns from extreme weather and predators.
- Choose kidding paddocks with kid safety in mind. Avoid potentially hazardous situations, such as uncovered wells and deep troughs.
- Netting or hingejoint fences around kidding paddocks are an option to effectively contain kids and reduce the risk of entanglement in fence wires. Note: Barbed wire is particularly hazardous in terms of entanglement.
- Secure netting fences with no gaps will deter some predators, particularly if netting is buried below the surface of the ground. An electric wire, positioned just above the ground, around the outside perimeter of the kidding paddock can also be an effective means of controlling some predators. Guard animals are another option.
- Undertake an on farm-predator control program to reduce predator numbers pre- kidding.
- The practice of flushing, which refers to high level feeding pre joining to increase ovulation rates, should only be used in situations where the system is geared to support multiple offspring. The nutritional requirements to grow quality fleece and raise multiple kids are very high. In order to successfully raise multiples, does must be provided with additional feed inputs and extra support at kidding. Multiple births are undesirable in broad-acre grazing systems that operate with minimal supervision and low levels of supplementary feeding.
- Shearing prior to kidding will make it easier for kids to access the doe's udder and reduces fleece staining.
- Select does for mothering ability and high fertility (if your system is able to support multiple births).
- Check does' udders after shearing and cull any animals that have damaged teats.

For more information on this topic refer to *Module 6 – Husbandry*.



◆ Management to avoid vegetable matter contamination in fleeces

Vegetable matter contamination will devalue your mohair clip. The process of carbonising, which is used to remove heavy vegetable matter fault from fleeces, is costly and can damage the fibre.

Fleece lines with vegetable matter fault of greater than 4% are considered to have no commercial value and growers may be charged a handling fee if such product enters the sale system.

Strategies to reduce vegetable matter contamination:

- Shear every six months – longer fleeces are more prone to contamination.
- Identify and understand the lifecycle of the weeds and pasture species growing on your property. Avoid grazing pastures with heavily fleeced goats when plants are seeding, or when particularly adhesive plants are present.
- Prepare alternative grazing options, such as green crop, crop stubble or paddocks that have been cut for hay/silage, for times of year when weed and pasture seeds are likely to be a problem.
- Control problem weeds.
- Schedule shearing to ensure that goats have short fleeces during periods when the contamination risk is high.
- Feed hay on the ground rather than in feeders where goats have to reach up to access the hay. This will reduce the risk of contamination from falling plant material.

◆ Management to reduce post-shearing mortality

Angoras are very susceptible to cold stress, particularly after shearing. It is the temperature differential that is important. The greatest potential for loss of life is when the temperature changes dramatically. Wet and windy conditions are particularly challenging for newly-shorn goats.

Effective shelter is critical for a mohair enterprise. Shelter from trees alone is insufficient; sheds with a roof and at least one wall are recommended. In bad weather, it is not necessary to herd or contain goats as they will naturally seek out shelter.

However, goats do not like to walk into the wind so locate shelters and select post shearing paddocks with this in mind.

At shearing, it is important to watch the weather carefully and listen for sheep graziers' weather warnings. If weather conditions are forecast to deteriorate, avoid wet fleeces and subsequent delays in shearing by moving unshorn goats undercover. In such circumstances, shorn goats should also be retained under cover, if space is available, or moved into well sheltered paddocks. Ensure that goats are well fed – being ruminants, the digestive process generates heat, which will help to maintain body temperature.



3. Harvesting – shearing

Angoras should be shorn at six-monthly intervals. Much of the shearing process is similar to that of a wool enterprise. This section will summarise best practice and highlight any shearing requirements that are different from those required for sheep.

◆ Shearing shed preparation

- Thoroughly clean the shearing shed prior to shearing. Remove any extraneous material left over from previous shearings. Clear the shed of surplus equipment. Ensure that there are no potential contaminants in the shed: Sweep away dog hairs, cobwebs or foreign fibres; remove any plastic, twine, string or wire; empty rubbish bins.
- Clear yards of contaminants such as twine, weeds and wire.
- Provide ash trays outside the shed for cigarette butts. The shearing shed should be a non-smoking area.
- Check and service all shearing equipment, as required.
- Replenish supplies of cutters, mohair combs, grinder paper, wool packs, oil, bale clips, stencil ink and first aid provisions.
- Assess the site for potential safety hazards and address any problems.
- For further information on shed preparation and shearing practice refer to the ClipCare guidelines. Reference details for the ClipCare program can be found in *Tool 10.1 – Finding further information*.

◆ Shearing plant

Mohair fleeces are naturally less greasy than wool, so with less lubricant in the fibre there is a tendency for shearing handpieces to overheat. If shearers find this a problem, the speed of the shearing plant needs to be slower than it would for shearing sheep. A practical example of how this can be achieved is presented in Ian and Helen Cathles' case study at the back of this module.

There are two common types of shearing plant:

- Multi stand overhead gear powered by an electric motor, which is found in most woolsheds – these will generally need adjustment to the pulley system to allow them to run at a slower speed.
- Individual stand electric plants. These can be purchased with dual speed control, incorporating a slower setting suitable for mohair.

For very small flocks, where it is not economically sound or practical to purchase a shearing plant, shearing can be done with hand blades or electric clippers.

◆ Animal preparation

- Muster stock and draft into age groups. Always start with the finest fleeced goats first and proceed with stock classes in order of increasing fibre diameter: Kids > young goats > adults. This will minimise the risk of contaminating fine, high value fleece lines with broader diameter, lower value fibre.
- Further information on mustering can be found in *Module 6 – Husbandry, Tool 6.9*.
- Dip goats in water to remove dust, if required. Dipping should be scheduled to allow sufficient time for fleeces to dry prior to the commencement of shearing.
- Allow goats to empty out in the yards prior to shedding. This will reduce the potential for manure and urine stain on fleeces.
- Keep goats dry. Watch the weather and review forecasts. If there is the likelihood of wet weather, shed as many unshorn animals as practical.
- Crutch and wig goats between shearings to reduce the incidence of dung and urine stain and avoid seeds in the eyes or hair blindness. The ideal time for crutching and wiggling is approximately four months after shearing.



◆ Shearers

- Arrange shearers and shed hands well in advance. Mohair Australia Limited and mohair brokers can provide lists of shearers who specialise in goats.
- Familiarise yourself with the Pastoral Industry Award pay rates. Refer to Tool 10.1 – Finding further information for relevant contact details.
- Negotiate shearer and shedhand pay and conditions. Items that need to be addressed include rate per animal, provision of meals or payment of meal allowance and who is supplying the combs.
- Ensure that you are presenting a safe workplace and operating procedure. Assess the situation and address any issues of concern. Routine occupational health and safety measures apply to all shearing sheds.
- Recommend the use of ‘mohair combs’. Specialist mohair combs have more teeth than traditional wool combs, reducing the risk of skin and teat cuts.
- Make ear plugs available to shearers and shedhands. Noise levels in a shearing shed can be quite high.



4. Marketing

◆ Classing the clip

Classing refers to the practice of sorting fleece into uniform product lines. There is a South African Mohair Classing Standard that presents a set of descriptors that should be used to separate and classify fleece lines. This standard has been developed by the mohair industry with consideration for international market requirements⁹. Details of the classing standard are provided in *Tool 10.3 – Australian Mohair Classing Standard*.

Mohair is classed by fibre diameter, length, character and style and fault (vegetable matter, stain, colour, kemp and medullated fibres).

Producers are encouraged to class their clip to industry standards and complete a specification sheet in preparation for sale of their product. Experienced growers may choose to class their own clip. In larger enterprises, or where the grower is inexperienced, a professional classer may be employed.



Image: AgriFutures

Depending on the quantity of mohair supplied and the level of competence of the classer, the broker may reclass the clip on receipt at the pooling centre. If the clip has been well classed prior to reaching the pooling facility, there will be minimal additional classing work required which will reduce the handling fee charged by the firm.

Classing workshops are run on a regular basis throughout Australia and provide an excellent opportunity for both inexperienced and experienced producers to improve their classing skills. Further details about classing courses can be found in *Tool 10.1 – Finding further information*.

When mohair is sold through the pooling system, provided that the producer has attempted to class the clip to industry standards and completed the necessary paperwork, he or she will receive a classer's report from the broker¹⁰. In addition to this report, the producer will

receive quantitative information about fleece quality and quantity, however this only applies where complete sale lots have been presented. This feedback should be used to improve future clip preparation and identify potential management and breeding issues which could be addressed to increase product returns.

Brokers encourage producers to attend the warehouse and go through their clip with them as a learning experience, to help improve the standard of clip preparation.

Complete sale lots are preferred. When there is insufficient quantity to make up a full lot, similar lines of fleece from different sources are bulked together to make a saleable lot. In such cases, the individual producer is paid on the basis of the quantity that they have contributed multiplied by the price per kilogram received for the complete sale lot.

◆ Selling the clip

Mohair in Australia is sold in greasy or unprocessed form at auction or by private treaty. There is one major mohair broker in Australia – the Australian Mohair Marketing Organisation (AMMO). This broker classes, pools and facilitates the sale of mohair on behalf of growers.

Often an individual producer will have insufficient mohair to form a sale lot. In such cases, brokers sort and pool fleeces from a range of properties to form uniform, saleable lots¹¹. Brokers offer mohair for sale by auction and/or private treaty. Bales are core sampled and sent for quantitative testing by the Australian Wool Testing Authority and most sale lots presented by brokers are accompanied by certification of weight, fibre diameter, yield and vegetable matter fault^{12, 13}.

The majority of Australia's mohair clip is processed overseas. Buyers or agents acting on behalf of interested processors generally source their mohair requirements through the auction system, private treaty sale through the brokers or, less often, direct purchase from larger mohair growers.

Mohair auctions are held two to three times per year. Some producers choose to stagger the shearing of different classes of goat throughout the year to improve the frequency of income. Whilst such a system is advantageous for cash flow, some of the disadvantages are that the yearly calendar of management becomes more complex and there are additional mustering and handling requirements.

Private treaty sales can be made at any time throughout the year. In some cases this will involve a broker and in others the sale will be negotiated directly between a producer and buyer. Another option is for growers to organise to ship their clip to South African brokers for sale. Generally, buyers who are seeking to purchase mohair in this manner are looking for larger, uniform lines of fleece. Success with this method of sale requires market contacts, good negotiating skills and a comprehensive knowledge of the specifications and value of the product that is being offered for sale.

Some innovative producers have developed niche markets, selling mohair direct to spinners and craft users. Skins also have a value and can be sold for the manufacture of leather goods.

A statutory levy of 1.5% applies to all mohair sold in Australia. This levy is used to fund research and development activities targeted to improve the mohair industry. The levy is collected by Levy Revenues Services and is directed to AgriFutures Australia.

Toolkit 10 – Mohair production

Tools

Tool 10.1 Acknowledgements and finding further information

Tool 10.2 Property selection

Tool 10.3 Australian Mohair Classing Standard

Case studies

Decision-making and adapting infrastructure – Ian and Helen Cathles

Enterprise diversity for economic diversity – Roger and Meegan Clark

Intensive management to optimise production – Rowena Doyle and Bob and June Liddy

Tool 10.1

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Care is taken to ensure the accuracy of the information contained in this publication.

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Finding further information

◆ Useful contacts

For all enquiries contact Mohair Australia.

Mohair Australia Limited

mohair.org.au

A key tool funded by AgriFutures Australia and developed by neXtgen Agri is an online hub known as "[The Goat Fibre Gateway](#)". Designed for the goat fibre industry, it comprises resources covering animal management, genetics, nutrition, marketing and fibre preparation.

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Breeding for Helminth resistance in fibre goats. Walkden-Brown, S. 2007. Rural Industries Research and Development Corporation. RIRDC Project No UNE-69A.

◆ Courses and workshops

EDGEnetwork[®] courses are available nationally. **Prograze**[®] is a pasture course for temperate pasture areas. To find your state contacts for **EDGEnetwork**[®] contact Meat & Livestock Australia.

GrazingforProfit[™] Training School – business school for grazing industry. Includes a nutrition and grazing management component. Resource Consulting Services (RCS), Queensland.
rcsaustralia.com.au

Mohair brokers conduct mohair classing and training workshops. Contact the Australian Mohair Marketing Organisation.

Breed societies conduct animal selection workshops. Mohair Australia Limited is the breed society for Angoras.

◆ Websites

AgriFutures Australia – agrifutures.com.au

Meat & Livestock Australia – mla.com.au

MLA Goats hub – mla.com.au/extension-training-and-tools/give-goats-a-go-hub

Mohair Australia Limited – mohair.com.au

Australian Government Department of Education, Employment and Workplace Relations (information on pastoral industry awards, including shearing rates) – dewr.gov.au

Bureau of Meteorology (weather forecasts) – bom.gov.au.

Goat Industry Council of Australia – gica.com.au

Mohair South Africa – mohair.co.za

Tool 10.2

Property selection

Large areas of Australia have the potential to run Angoras. As a general comment, Angora goats are suitable for those areas where wool sheep and cropping are conducted successfully.

Module 1 – Property planning is a good starting point for analysing the potential suitability of a particular property and/or area for establishing a goat enterprise. In a fibre producing enterprise, two of the most critical elements for consideration are the climate and the potential for vegetable matter contamination of fleeces.

Climate

In general, goats prefer dry, warm environments, but like all grazing based enterprises, rainfall is the key driver of feed production.

The Australian mohair industry is now breeding larger framed, finer fleeced animals that are suited to a wide range of climate zones.

Unlike the meat sector, low input rangeland systems (extensive systems) are not suitable for mohair production because of the amount and type of vegetation, particularly burrs, which exist in these areas. With properties spanning large areas, mustering in rangeland environments is more difficult and time consuming which is disadvantageous for a mohair enterprise where goats need to be mustered at least four times a year for husbandry (crutching and wiggling) and shearing. Another consideration in rangeland areas is the influence of wild bucks which would be undesirable in a breeding operation where the intent is maintaining or improving fleece quality.

Areas where the average annual rainfall is greater than 1,000 mm are generally considered less desirable for mohair production.

There are also some cautions for areas of high rainfall, cold temperatures and high altitude, particularly where wind chill is a factor. In such conditions, the following factors require extra consideration:

- Shelter – Shelter sheds are essential. Such structures should have a roof and at least one wall to protect goats from prevailing wind and rain.
- Shearing times – Shearing should be timed to avoid the harshest extremes of the climate.
- Foot trimming – In the absence of rocky ground, soft soil conditions may necessitate regular foot trimming to keep hooves in shape.
- Internal parasites – Moist, mild conditions favour the survival of internal parasite larvae. If animals are forced to graze close to the ground, regular monitoring of parasite burdens (faecal egg counts) and drenching may be required.

Vegetable matter contamination

In selecting a location for a fibre enterprise, the type of vegetation growing in a particular area is an important consideration in terms of the risk of contamination. The risk of fleece contamination is high in areas where there is a large presence of plants with particularly adhesive or invasive spines or seed heads.

Vegetable matter contamination significantly reduces fleece values and if greater than 4% the fleece is considered to have no commercial value.

Angoras can be used to manage the seeding of weeds. Reduced seeding can be achieved by introducing goats to a weed infested area after shearing and prior to seed head maturation. The Angoras will eat the seeds before they mature, preventing seed set and reducing the possibility of fibre contamination. This technique works well with species such as thistles, spear grass and barley grass.

Management can help to limit the level of contamination but, under conditions where there is a high plant challenge, is unlikely to prevent vegetable matter fault. Identify problem plant species and avoid areas where these species grow in abundance.

Some particularly problematic plants include Trefoil (*Medicago* species), Noogoora burr (*Xanthium occidentale*) and Horehound (*Marrubium vulgare*).

Tool 10.3

Mohair classing

For each age group, different classing symbols are used to describe the fibre. These symbols are as follows.

◆ Kid (symbol K)

Main types: FFKID, FK, K

K indicates kid quality fibre. FF/F prefix indicates fine fibre. S indicates best style.

» First shearing (six months of age, summer kid)

First shearing can be described as (Fine Fine Kid). The majority of FFK would be classed as either CFFK, BFFK, or BSFFK. Any stronger kid hair would be classed into the appropriate FK line, e.g., CFK, BFK or BSFK.

» Second shearing (12 months of age, winter kid)

Fibre from the second shearing is stronger than the first shearing and therefore classified as FK or K. The Fine Kid will be classed as CFK, BFK or BSFK. The kid would be BK, CK or BSK.

◆ Young goat (symbol YG) – 18 months of age

Main types: FYG, FFYG, YG

YG indicates fibre of young goat quality. S after length prefix indicates best style.

Young Goat quality fibre is generally obtained from Angoras about 18 months of age (or third shearing). If a flock is derived from fine bloodlines, then goats of 24 months of age (or fourth shearing) may also produce young goat quality fibre. However, all strong fleece types and strong fleece portions such as necks/breeches MUST be sorted into the appropriate Fine Adult line. The bulk of this age group would be classified as either CFYG or CFFYG. Any longer fibre, i.e., 125-150 mm would be classed as BFYG, BFFYG or BYG.

◆ Fine adult (symbol FH) – fourth to sixth shearing

Main types: FFH, FH, CXFH

FFH indicates fibre finer than the average for this age group. FH indicates fibre stronger than young goat. X as a second letter indicates light Kemp fault.

» Fourth shearing

The good, soft handling stylish fleeces may be classified as CFFH or BFFH, the finest portions of this age group may meet the requirements for YG. The fibre of good style and average fineness from these shearings will be classed as BFH. Fleeces carrying light Kemp fault will be classed as CXFH.

» Fifth shearing

The bulk of this shearing would best be described as CFH and BFH. The finest portion can be classed into CFFH or BFFH.

◆ **Adult (symbol FH, H) – sixth shearing or 36 months of age or older**

FH indicates fine hair. H indicates adult quality.

Adult will be classified as H (hair). This line will contain the strongest adult mohair and will be free or nearly free of kemp, i.e., CH or BH. Any medium Kemp fleeces should be placed into the CYFH line (C and B lengths). Shorter types, i.e., 100-125 mm would generally be classed into CFH or CH.

◆ **Example of a typical six-month shearing**

» **Kids**

BFFK – fine fine kid good style

BKID – average style kid

CFK – shorter fine kid and kid

» **Young goats**

BSFYG – good style fine young goat

BFYG – average style young goat

CFYG (or CFFYG) – shorter young goat fleeces

» **Adults**

BFFH – good fine fine adult

BFH – average style fine adult

CFFH – shorter adult

BSFH – good style adult

CFH – average style FH

» **Out of sorts**

Sheared fibre may also include out of sorts, such as stains, clots and veg faults:

» **Stains**

FSTN – includes light urine and pen stain and skirtings from kid/young goat, minimum 90 mm

STN – adult light stains, includes light urine and pen stain and skirtings, minimum 100 mm

DSTN – short light stains (50-80 mm)

FLOX – medium-heavy stains, minimum 90 mm

LOX – heavy stains; medium-heavy urine and pen stains

DLOX – medium-heavy stains, 50-80 mm

» **Clots**

FSCOT – includes light cotted fleeces from finer fleeces

SCOT – includes light cotted fleeces, overlong staple cotted fleeces and cotted edges skirted from fleece lines

COT – light to medium cotted fleeces

» Veg fault

CFKSDY – fine kid and kid seed/burry fleeces and skirtings

CYGSDY – young goat seedy/burry fleeces and skirtings

CFHSDY – fine adult and adult seedy-burry fleeces and skirtings

Tool 10.4

Mohair brokers

- ◆ Australian Mohair Marketing Organisation Ltd

Classing Centre and Warehouse

PO Box 16

Lot 3, River Street

Narrandera NSW 2700

02 6959 2988

admin@ausmohair.com.au

ausmohair.com.au

- ◆ The House of Fibre

7 Metcalfe Street, Deal Party

Port Elizabeth 6001

South Africa

Manager: Pierre Van der Vyver

011 27 66 056 8125

Australian contact: Robert Mudford

0428 876 282

robertandmeg@bigpond.com

house-of-fibre.co.za

Mohair buyers

- ◆ Australasian Mohair Trading Pty Ltd

Auction buyer

Contact: David Williams

0419 352 399

david@amtMoh.com.au

- ◆ Australian Speciality Fibres

Suite 9/2 Ambitious Link

Bibra Lake WA 6953

Manager: John Bradbury

0418 926 899

john@fremantlewool.com.au

australianspecialityfibres.com.au

◆ Australian Mohair Services

Contact: John Hoornweg

440 Paynters Road

Earlston VIC 3669

0428 488 422

john@australianmohairservices.com.au

◆ Ross Wheatley

Representing Sudwolle South Africa and Stucken & Co. South Africa

0411 691 781

ross.wheatley@hotmail.com

Case studies

Decision making and adapting infrastructure

Name: Ian and Helen Cathles

Property name: Cooradigbee

Property location: Wee Jasper, NSW (Southern Tablelands)

Property size: 3,000ha

Number of goats: 1,400

Main goat enterprise: Mohair production

Target market: Mohair – export; Stud – all animals are reared under commercial grazing conditions and sold to producers who are aiming to increase their flock and maximise returns

Other farm enterprises: Cooradigbee Conferencing and Quarters; Superfine merino sheep; Land leased to neighbours

Ian and Helen started their goat enterprise in the mid 1980s, as they were tired of battling weeds. The terrain is difficult, with limestone outcrops and steep bush country. Increasing labour costs were making it uneconomic to keep control of noxious weeds using conventional methods.

At the time, the options were dairy, cashmere or mohair production. Having investigated the range of breeds, they came to the conclusion that Angora goat behaviour was similar to that of sheep, in so much as they are not an animal that tends to go over fences – they will go through holes in or under fences, but not over. This was the deciding factor.

“The ‘goat’ decision was made purely on a weed control basis to start and we consciously decided that any income we might be able to get from the goats was a bonus” said Ian.

At the time, sourcing goats was a problem. To acquire any number of animals meant obtaining groups of 5-30 animals at a time from properties spread across a wide area. Ultimately, they were able to buy out a couple of complete flocks and their enterprise started to grow.

All animals are paddock birthed and reared in a broad acre model with Maremma guard dogs used to protect the flock from predators. Over the years, the Angora flock built up to 2,500 head, run in conjunction with about 10,000 superfine wool merino sheep. Angora goats have white hair that dyes extremely well so the risk of contaminating the wool clip was minimised. However, Ian and Helen are very conscious of the contamination risk and make sure that the shearing shed is very well cleaned between goats and sheep.

One of the complications that they encountered in shearing goats was that mohair fleeces do not have a natural lubricant so there was potential for handpieces to overheat. Ian adjusted the overhead gear to minimise that risk, reducing its speed from 2,800rpm to 2,000rpm which allowed the handpiece to run much cooler.

On one of their properties they purchased multi speed shearing plants that ran from a generator and on the second they simply adapted the existing shearing plant. In the latter case, the shearing shed had overhead gear driven by an electric motor. Ian adapted the plant

by getting a dual speed pulley made up for the electric motor. With this in place, Ian points out that the time to change speed of the overhead gear is ‘literally five minutes’.

At one stage, Ian and Helen experimented with crossing their lower grade (cull) Angoras with Boer bucks for the meat trade however they encountered a major problem with predators. The losses that they suffered in getting animals to weaning were too high to sustain. At the time, the long distance to the nearest abattoir was not practical nor economic for the transport of smaller consignments. Coupled with no fleece value as a backup for the meat enterprise, they chose to concentrate on mohair production.

In about 2002 they decided to lease out some of their land to neighbours and downsize their farming operation, reducing stock numbers to 1,000 Angoras and 1,500 superfine merinos. Drought forced further reductions in the sheep flock with only breeders retained. The goat flock has been maintained and, in the last twelve months, increased owing to profitability.

Because all animals are raised under an extensive management system, weighing and testing of the second and third shearing fleeces (one to two years old) of stud animals is carried out to identify superior fleece traits.

Bucks are not selected until at least two years of age to make sure desirable fleece characteristics are maintained in adult fleeces as well as identifying maximum growth rates for body weight. This also allows animals to be tested under a variety of climate and pasture conditions.

“Drought feeding has been simplified since we started to feed 14% pellets instead of straight grain. The biosecurity feature of not bringing in weeds with the grain has been enormous. The pellets are easier to start feeding the goats and sheep and the balance of protein, fibre and energy is just right for the goats. We find that dividing the ration into three feeds per week is ideal with the goats not suffering any digestive upsets. In the past we had tried stretching grain feeding out to every fourth day, which had resulted in stock losses.” said Ian.

An example of a typical Classing Report for this property is presented below:

Last name	Test no.	Line weight	Grower class	Test diameter	Test CV	Assigned
CATHLES	C053	198	BFFH	34.8	31.6	BFH
CATHLES	C054	201.5	BFFHK	32.5	41.8	BFFHK
CATHLES	C055	206	BYG	31.6	30.1	BYG
CATHLES	C056	175	BFFH	32.2	29.5	BFFH
CATHLES	C057	201	BFFH	34.9	31.8	BFH
CATHLES	C058	103	BKID	25.6	27.7	BKID
CATHLES	C059	87	BSK	28.2	26.6	SBSK
CATHLES	C060	51.5	BFK	24.1	26.1	BFK
CATHLES	C061	79	BYG	31.4	27.1	BYG
CATHLES	C062	52	BFH	37.0	29.2	BFH

Enterprise diversity for economic diversity

Name: Roger and Meegan Clark

Property name: Hillrose

Property location: Boorowa, NSW

Property size: 800ha

Number of goats: 1,500

Main goat enterprise: Commercial mohair production

Target market: Mohair – export; Meat – older cast for age animals sold for the commodity meat market

Other farm enterprises: Viticulture, crossbred lambs, crops and cattle

Roger and Meegan Clark's farm business is comprised of five different enterprises: Mohair, viticulture, crossbred lambs, crops and cattle. Mohair contributes to the income stream with sales from twice yearly shearing.

One of the main benefits of such a diverse mix of enterprises is the pattern of cashflow. With product sales spread across the year, the income line is relatively level, in contrast to the troughs and peaks experienced in many single enterprise businesses.

Roger explains that the key to managing the business is organisation and planning. The enterprises that make up the Clark's business have been selected because they suit the growing conditions and fit together well in the farming calendar. There is also a strong degree of complementarity between the enterprises, particularly in relation to grazing management.

Sheep, cattle and goats have different grazing patterns which, when combined in a grazing system, have benefits in term of weed control, promotion of desirable species, pasture utilisation and uniformity of grazing pressure across pastures. In combination, sheep and cattle or goats and cattle have few common internal parasites, so cross grazing can have real benefit in terms of implementing strategies to control internal parasites.

The inclusion of grazing animals in a cropping system offers a productive way to reduce trash levels in crop stubbles. Strategic grazing can also assist with weed control in the vineyard. The rotation of crops and pastures provides an effective disease break and additional opportunities to control pests and weeds in the move from one phase to another. (For information on the complementary aspects of different enterprise mixes refer to *Module 1 – Property planning*.)

Roger runs Angoras as a self-replacing herd. Wethers are the first to be culled when climatic conditions require a reduction in grazing pressure.

All young animals are run on to replace the older wethers and breeding does as the progeny are generally of superior quality to their mothers. Some buck kids are run on as replacement sires and outside bucks are also used to introduce new blood and superior genetics.

Younger animals are most profitable to run as their fleeces attract the highest prices per kilogram. Older and inferior animals are culled into the meat trade.

Roger prefers to select animals in their fourth to fifth fleeces when they more accurately exhibit their genetic potential.

Commenting on the relative contribution of fibre and meat production to a mixed farm business, Roger says, "With a mohair enterprise, if a doe fails to produce a kid, she still produces fibre which represents income; no kid may equal about a kilogram of extra fibre on the doe." In a meat enterprise, a breeding female that does not produce an offspring presents a cost to the enterprise without an income. Along similar lines, later joining at two years is not seen as such a disadvantage in a fibre enterprise because the young animal is growing saleable fleece in the interim.

Intensive management to optimise production

Name: Rowena Doyle, Bob and June Liddy

Property name: Sylvania Park

Property location: Horsham, Victoria

Property size: 243ha

Number of goats: 1,000

Main goat enterprise: Mohair production

Target market: Mohair – export; Meat – capretto to butchers and restaurants, cull animals for export; Hides – export and craft industry

Other farm enterprises: Cattle, crops, accommodation and tourism

Rowena Doyle and Bob and June Liddy run a mixed enterprise operation incorporating goats for meat and fibre. In their business, weaning percentage is critical.

Having a high weaning percentage allows a heavy culling program. The greatest intensity of culling occurs within the young goat flock, generating income from the sale of meat and leather products. Goats are culled based on fleece quality and physical traits. Most buck kids are culled along with the bottom 25% of doe kids. High selection pressure facilitates rapid genetic improvement within the flock.

Culling decisions are generally made when goats are six to twelve months of age. Angoras lend themselves well to a secondary meat enterprise because they are smaller and slower maturing than most meat breeders. Angoras can stay within the specifications for premium capretto for longer than meat breeds. During this time, a producer can shear one or two highly valued kid fleeces.

Intensive management during the kidding period is an important factor in achieving the 100% weaning percentage which is the average rate for this business. Does are joined at 18 months of age which can lower the kidding percentage as younger animals are less likely to join in the first year than mature does. However, the benefit of joining younger animals is that it increases the rate at which improved genetics move through into the flock.

The management system at kidding time involves the penning of recently birthed does and their kids. Pregnant does are carefully monitored in the kidding paddocks. The does and kids are collected on the day of birth and transported to a shed where pens have been set up. This process is aided by the fact that goats usually give birth during daylight hours.

The machinery shed doubles as the kidding shed. The machinery is cleared out and about 70 temporary pens are constructed in the shed. Does with multiple kids are allocated to individual pens, whilst singles may be housed in single pens or larger yards depending on the weather and time of birth. If conditions are wet and the birth occurs close to dark, a doe with a single kid will be individually penned. If the weather is fine, does with singles will be placed in larger yards with a small number of like animals – approximately five does with kids per yard.

Doe condition (teats and milk supply) is carefully monitored to ensure that kids are being well fed. Kids are identity tagged and recorded in the kidding book. Doe kids receive coloured sire tags at birth. This information is correlated with joining records.

Once the manager is confident that does and kids are well bonded and that the kids are strong and feeding well, they are moved on to high quality, improved pastures. This usually occurs at around two days after birth.

The kidding period lasts for 6–8 weeks during which time 400 does are managed by one labour unit.

Another feature of this business is the complementarity between enterprises. The mix of goats, cattle and crops works very well. Cross grazing with cattle and goats offers enhanced internal parasite control, opportunities for weed control and increased pasture utilisation. In the cropping phase, stubble grazing provides a valuable source of feed in late summer when pasture is in short supply whilst at the same time reducing weed and trash levels in the paddock in preparation for the next crop.

Endnotes

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