2. Matching biology and behaviour to farming techniques

South Africa seems to have perfected the “art” of mohair production. I won’t say “science” because there is not a lot of evidence that Angora farming has been led by an academic or scientific approach. The South Africans are nothing if not pragmatists. What works in this dry, but surprisingly populated area, says much for the resilience and dominating attitude of the white farming community. More of this later but suffice to say that large scale production of any agricultural product requires a specific set of conditions. The trick is to match the animal’s biology to the available environment and in South Africa this very clearly includes the human component for all management practices.

Each species of livestock has a set of behavioural characteristics which are inherited. No doubt these inherited characteristics have developed over many generations as a response to environmental exposure via **natural selection**. Animals which fail to respond die or are killed by predators or climatic conditions; and animals which survive pass on their genetic nature and characteristics to their progeny thus changing the overall genetic structure of the surviving population. This takes a long time and requires the environmental conditions which do the selection to remain relatively constant.

Figure 1. Farmed Angoras browsing on mountainous Karoo veldt – look closely.

Goats seem to have evolved in dry **scrub-land environments.** Wet and cold conditions are quite fatal, and survival depends on animals utilizing cover from such adverse weather. Dry scrub-land has limited pasture but abundant woody plants. The goat seems to have developed a remarkable ability to select and utilize such "**browse**". The animals can cover large distances to select and pick nutrient dense new growth from established permanent scrub. Such fodder often contains high tannins levels and other chemicals which seem to be detoxified in the goats' livers. Not only do goats learn where fodder and cover are available, but they also have an inquisitive nature and an ability to find and consume a wide variety of plant material.

In new environments, this may lead to poisoning from plants the animals are not familiar with. The wide dietary range and inquisitive nature may well be responsible for animals learning to choose particular plants at particular stages of growth. Goats also have an ability to reject plants or pasture which has been grazed over in the near past and tend not to grow well if forced to remain in small grazed areas. Goats don't do well in competition with sheep which are happy to graze pasture down to the ground. Often Australian farmland is open country with little or no browse and no "natural" protection so there is some requirement for added **shelter** and a need for larger areas with lower stocking rates to allow pasture to gain some height.

Goats are inquisitive and travel large distances while retaining knowledge of their home range, and they seek protected areas when exposed to inclement weather. Goats have also developed a strong flock instinct and tend to move together. A goat by itself is usually ill or about to give birth. On the other hand, it may take some time for the flock to make up its collective mind and the mob may become confused or lost when presented with complicated paddock layouts, particularly at night when rain forces a move from the camp.

Kidding behaviour has also developed in relation to a home range and the available camps. Unlike sheep which lamb and keep their offspring with them from birth, goats give birth and "plant" their kids while grazing. It may take as long as 3-4 weeks before the kids regularly follow their mothers all day. There are a number of variations to this model which depend on the security of the camp. Does may stay close to the camp when they kid or leave kids in a crèche supervised by several does who are last to move out to graze

Figure 2. Week old Angora kids in their home shed. Does return several times a day (and at night) to feed their kids.

in the early morning. Does return several times a day and in the evening to feed their kids which they readily identify by smell. They only feed their own kids but sometimes kids learn to ambush other mothers at water or on the camp and obtain extra milk. But when feed is scarce or the conditions less secure, does may move

away from the mob to kid and hide the kids each day while grazing alone. This strategy obviously works but there is an obvious danger of predation while the mother is off grazing. It remains a matter of some debate as to how effective does are at discouraging **predation** but there are plenty of examples of very low weaning percentages where predation is uncontrolled.

Managing kidding is a complex activity**.** Australian farmers have developed their own techniques but all must deal with the basic behaviours. Does often have 2 kids and one can be weaker and may be lost. Losses at kidding can be quite high but in **extensive management** systems might not even be noticed because the deaths are hidden. Only in **intensive systems** with does housed at night and mothers and kids penned for 48 hours can complete observations be made. Again, it depends a little on the specific techniques employed and the amount of record keeping that is being undertaken.

Kidding can be an exhausting and torrid time for farmers. Perhaps it depends on the general technique chosen. Methods of lambing Merino ewes have been developed over nearly 200 years. Ewe and lamb behaviour has been utilized to lamb down large flocks in open paddocks with little or no supervision. Losses can be very high when lambing in winter with both rain and frosts taking a heavy toll. To a large degree these losses have been accepted and no doubt there has been considerable "natural" selection for **survival**. Lambs seem much stronger than kids. While we might like to follow this sheep model with goats it might have to be accepted that this is just not practical.

Kidding would seem to be a major "bottle neck" in management when it comes to survival and **weaning rates** in larger flocks. Kids are fragile and subject to rapid chilling from exposed conditions. With the doe planting her kid(s) and moving off to graze, **predation** is a fundamental problem. We may yet learn extensive kidding strategies like October kidding, mass fox control, specialised bush shelter paddocks and **guard animals**, but so far, most Angora breeders seem to opt for intensive shedding and penning. This has its own problems, but more than one potential mohair grower has underestimated the problem of successful kidding management and purchased large flocks only to be faced with disaster. If you are going to use intensive methods as a fall-back position, you need sufficient sheds, pens and labour to deal with the animals which may result from a "**kidding storm**" (see page 11) which coincides with poor weather conditions.

The condition of the does at the time of kidding is important and this includes **parasite control**. Bigger, fatter does have bigger fatter kids which survive well. There are exceptions. Maiden does especially, have greater losses because of:

- Small, weak kids failing to drink,
- chilling on frosty mornings when dropped late at night or early in the day, or during wet conditions,
- does failing to produce milk, or,
- does failing to allow feeding.

The development of the **maternal bond** is essential, and this begins even before the doe stands after delivery. A doe will reach around and examine the kid which has appeared behind her. She may even suck a teat, breaking the seal, which develops as the udder fills. A maiden does may display some shock at first seeing her kid but soon investigates and starts to groom the kid, licking and "chatting" to the kid which responds sometimes with loud cries. Vocal communication can be observed in the doe in the lead up to parturition. Careful listening can allow the identifications of animals about to give birth. After the birth the doe will often rest lying next to her kid but, as the kid gains strength and stands, the doe will accept nuzzling behaviour leading to sucking. A second kid can confuse the situation as the doe lies to deliver it leaving the first kid to look after itself for as long as 30 minutes. Getting it all together seems to be a rather confused time but, if left undisturbed, there is generally a successful outcome.

Of course, adverse weather can produce bad results. Bringing the doe and kid(s) into a sheltered pen runs the risk of upsetting the bonding process though the doe usually seems to be tolerant of some disturbances. Kids can be quite active and follow a doe if she is moved. In an open shed a doe will follow a herdsman carrying her kid(s) close to the ground towards a pen. Most does will move into a pen when her kids are left there. This depends on how active and vocal the kids are and how quiet the doe is. Sometimes the doe requires vigorous catching and placing in the pen with her kids. A crook may be handy. Leaving the doe alone with her kids assists the development of the bond but in some cases, it is necessary to give a kid a drink from the udder. A heat source such as a flood light can assist to revive "**frozen**" kids but manually placing the kid on a teat to drink is almost essential.

The nature of the **bonding** is of interest**.** Certainly, vocal links between the doe and her kids are recognised. Smell and taste are used by the doe and this seems to be reinforced by the sucking/suckling process and it may involve the odour of the doe's own milk on the kid(s). These features of identification must be overcome if a farmer wishes to **foster** a kid to another doe. This only works during the first 24 hours after giving birth when the doe is learning the taste/smell of her own kid(s). Fostering rarely works if the doe has already learned to identify her kid so trying to double up on a doe is usually unsuccessful. However, persistence sometimes can be rewarded if continuing to give the kid a drink from a penned doe and leaving the kid with the doe. It is said that tying a dog outside the pen may induce the doe to protect the kid and bond to it but once rejected (butted away) success is unlikely.

The **flock behaviour** can be utilized by shedding kidding mobs each night, especially with some feeding of grain or hay. Over several weeks the mob learns to return "home" every night. When begun pre-kidding, this activity can result in does kidding in or near the shed which greatly assists management. The traditional "drift lambing" system for sheep (where ewes with new lambs are left behind as the mob is drifted away to a new paddock) fails badly for goats, because of their perhaps unusual habit of "planting" their kids.

Figure 3. Intensive kidding systems maximise survival. Pens 1.2m square receive newly born kids with mother for 48 hours. Some pens have flood light (heaters) for "frozen kids".

Figure 4. At 5 days kids can be moved to crèche sheds.

Mothers can be driven on foot.

Figure 5. Housing at night for 3 weeks is effective fox protection. Release in the morning sees a charge for the paddock.

Figure 6. After the charge, kids have second thoughts and retreat to the shed while mothers head out to graze.

Vocalisation. Goats can be quite vocal. There are a number of different calls including bickering to unborn kids at kidding, bleating at kids to come to feed, bleating of kids to call mother to be fed, screaming (panicked bleating “help”), loud objections to treatments like shearing, or bleating with

birth contractions; snorting to warn the mob of the presence of a cat or other predator. One vet, I remember, expressed amazement that a doe and her kid would stand at opposite ends of a paddock calling to each other but not willing to move.

Figure 7. Does with older kids may separate from the mob especially when good feed is scarce.

Goats have a definite **pecking order** within their flock or group. They identify leaders and have a knowledge of their respective position in the hierarchy. Occasionally a dispute will be obvious as animals fight by butting heads and either bite or hook with their horns. Bucks can take this fighting more seriously but apart from **entangling horns** which can be fatal, they rarely do much damage to each other. With Angora goats, shearing seems to destroy the recognition process and there may be a period of days after shearing (or when mobs are joined together) when aggressive activity is observed while the hierarchy is re-established.

Another case of re-establishing dominance occurs when mating bucks are put back together after mating - there will be fighting. It is wise if possible to put 3 or more animals back together, so the fights are spread out or the animals are distracted.

Butting through a fence or a pen wall is observed, even when animals are from the same mob. The effect is often to break down the fence or pen and allow “boxing” or mixing of mobs which may have been separated for some reason (kidded does from non-kidded does, or different mating mobs). Of particular importance is when mating mobs have been established. Such mobs should not be placed in adjacent paddocks. Doe mobs with kids at foot should also be separated by at least two fences. If not, boxing is bound to happen and even if not, there can be the odd kid which, somehow, gets through a fence into the wrong mob.

While talking about aggressive behaviour its worth pointing out that bucks are rarely dangerous though they may be strong and hard to handle particularly at shearing. Hooking and biting are two responses to being up-ended for shearing. It is becoming common practice at shearing to sedate older bucks for Occupational Health and Safety considerations. Older bucks also have a slight tendency to attack fences and sheds either to get to mating mobs of does or simply to vent frustration – by “bending the furniture”.

Seasonality and **day length**. Goats have evolved at various latitudes. Angoras, surprisingly, are not dissimilar to British breeds of sheep (Ankara is at 39 degrees North and London is at 51 degrees North and noting that Bass Straight is 39 degrees South). Both British sheep and Angora goats have a clearly defined **breeding season** and a cyclical **fleece growth rhythm**. Both these physiological adaptions are mediated by day length. Other goat breeds (essentially dairy types in which, superficially, seem to be of European origin but may well have be influenced by Roman (or maybe even earlier) migration, have a long breeding season and indeed, **Merino sheep** which also seem to have evolved at lower (equatorial) latitudes where change in day length is not as marked have much longer breeding seasons. But these breeding seasons are still autumn based.

The Buck Effect and **Kidding Storms.** Despite this seasonality there is a clear "buck effect" where females respond to the arrival of bucks by "short cycling", coming into oestrus after 7 to 12 days. At least in Angoras this nearly always results in "kidding storms" 156 days after the beginning of mating. Such storms occur both, after joining at the beginning of the season (usually about the middle of February) and later, if mating is delayed for some reason.

Just why Angoras begin to cycle in February is a bit difficult to determine. With a 5-month (149 day) gestation that means a rush of kids in late July – essentially the middle of winter. One would have thought that kidding in September or later would be more efficient in terms of **survival** of the kids, so natural selection would have delayed the mating cycle to achieve that result. One can only assume that the does (and bucks in terms of the **rut**) respond to decreasing day length, the rate of which is getting to a maximum in February (60 days after the summer solstice). Maybe it is of interest that before the modern importation of Angoras in Australia (what is now known as the Australian strain – or now, **"Heritage" Angoras**) had a somewhat longer mating season. It was possible to get successful group mating at the end of January for a June kidding. The likely reason for this was the high milk goat genetic content in the strain which also explained the high **kemp levels**, high scoured yield of fleeces and **high fecundity** (many triplets) in most of the animals.

Kidding Pattern. Kidding at Cudal has been intensively managed at Cudal since 1980. Mating has nearly always been organised with bucks being introduced to doe mobs on a given day so the theoretical date to begin kidding is known (Mating date + 149 days). On occasions **abortions** or premature kids are observed close to that date but normal births usually begin on about day 4. If does were cycling at the time of buck release and does held to their cycle, we would expect to see 5 does per 100 kidding each day. A **Buck effect** (short cycling) would result in more than this over the period from day 7 to 12. By examining the kidding records a buck effect of this type was observed in 19 of the 37 years. In a further 11 years a buck effect was observed beginning of about day 12. In 4 years the buck effect was observed at about day 24 and in 2 years (1984 and 2009) a buck effect was observed after 29 days. No buck effect was seen in only in two years (1996 and 2001).

Such observations are difficult to interpret. A general delay in buck activity is hard to detect but it would seem that in drought years onset of cycling may be delayed but there is still usually some **synchronisation**. In any event, in nearly every year there was a kidding storm of some sort and it usually, but not always, occurred between 156 and 160 days post buck release. The message is that you need facilities to cope with a rush of does kidding over a 4-day period. For every 200 does there is a peak demand for about 30 pens. In paddock kidding, major losses can occur if this coincides with wet weather.

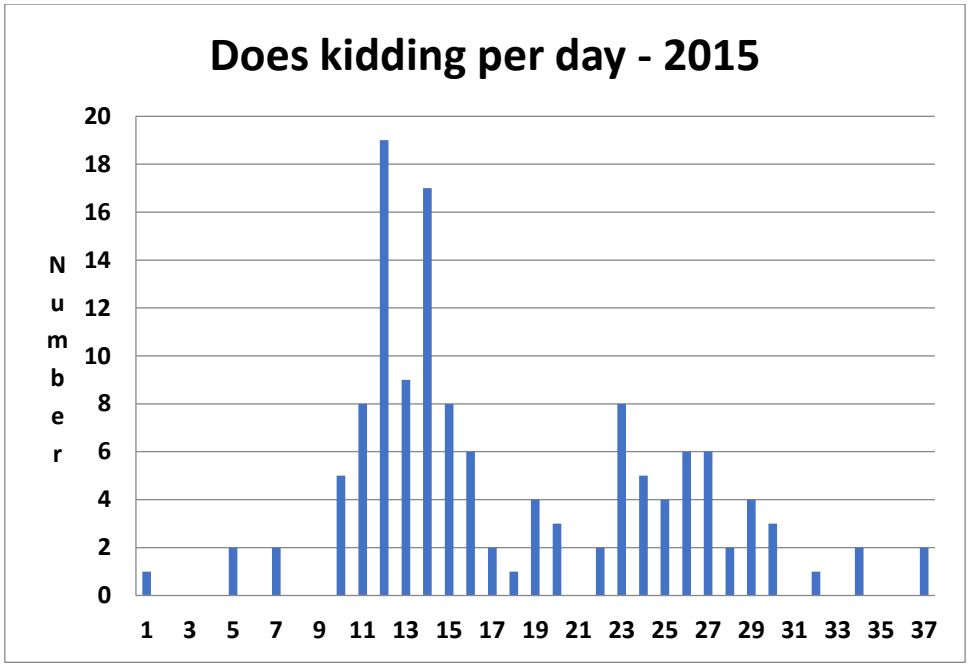

Figure 8. Typical kidding pattern with day 1 at Buck release+149 days and a synchronised mating 7 to 12 days later. With no buck effect, there would be 7 does kidding each day.

Figure 9. Maximum survival is achieved with intensive kidding and this requires about 30 pens per 200 does to allow for peak kidding events resulting from the buck effect at mating.

Seasonality of fleece growth. Another aspect of seasonality which is also controlled by day length (in this case increasing day length) is the (partial) moult of the fleece. This presents some problems for farmers wishing to harvest the fleece (shear) every six months. In effect, the Angora produces a very long fleece (20+cm) in its annual growth cycle but in the main, textile manufacturers want 11cm to 13cm of fleece and this is just possible shearing twice a year. So, in the case of mohair fibre this is two half fleeces.

My work has shown that the growth cycle for the fleece results in rapid length growth (and full skin follicle activity) starting in September reaching a peak in December then a gradual slowing of growth through autumn. In July and August skin follicle activity declines rapidly ending in the shedding of a small proportion of fibres and subsequent regrowth. See Chapter 4.

These shed fibres tend to move horizontally through the remaining fleece causing a "**cot**" or layer of tangled fibres. In sheep, this band is referred to as "**the rise**". Depending on individual predisposition, the fleece may hold in the cot until shearing, or fall off especially from the neck, belly and hind quarters. This may occur as the follicle activity picks up pushing the previous year's fibre out of the skin. This shedding was seen regularly in the old Australian Angoras and was considerably worse in **crossbreds** (and lactating does). Shedding was seen as a primitive characteristic and it was surprising to see the same cycle appearing in the imports from Texas and South Africa.

While complete shedding is now rarely seen, individual young bucks of 12 months of age (in particular) are sometimes very difficult to shear, presumably because of the double layer of fibres on the skin. While not visible as such it proves almost impossible to push a hand piece through the fleece at skin level. Advice from Texas was simply to delay shearing for a month. Alternatively (or as well) animals which proved to be "**poor combers**" could be culled.

Domestication. Animal species which are farmed have two common behavioural characteristics. Firstly, the species (or maybe even just a breed) are relatively docile and generally not aggressive to humans. They move in mobs and can be mustered because the animals flock together and move away from the farmer in a group. Secondly, the majority of farmed animal species are not overly athletic, and while individuals may not allow close handling, they don't move far away from humans even in yards. In order of **tractability** one might nominate sheep, cattle, goats, alpacas, deer and buffalo. The latter two have a reputation as being either flighty, or actually aggressive, especially during mating and protecting their young. That said, is unwise to ever trust a bull or get between a cow and her calf. Also, there are levels of pacification. Show animals can be trained to a halter and to lead but it takes perseverance and practice. Poddy animals favour humans but present difficulties in a mob because they tend to move towards the drover rather than remain with the mob.

Droving Angoras. Angora goats are generally regarded as particularly placid and rarely create problems either when handled or to fencing. However, it should be remembered that all goats will test their environment and are inclined to find holes in, or under, fences thus exploiting a wider range than management might wish. Young stock can be particularly inquisitive and, of course, can exploit smaller holes. Goats tend not to follow the "first law of motion" but follow their own rule. That is, "*a goat will remain stationery or continue in a straight line unless offered an alternative to move around a corner*". Further, "*a goat travelling in a straight line will mistrust its decision and more than likely change direction or even reverse its direction of travel, especially when confronted with a new environment or when presented with a stressful situation*". In management terms, this means - don't get too close to a moving mob and never chase a break-away animal – it will soon discover it's the odd one out and circle back to the mob; and, if it's possible to go the wrong way, they will!

The exception to such movement is the "poddy" or hand reared animal. Even when relegated to a mob, they will spot a farmer first and come towards him/her often bringing the mob with them. This can be extremely

annoying when trying to muster a mob but gives rise to the "**Judas goat**" concept which can be effective in controlling mobs in yards and for loading trucks. That said, a well-structured loading race system will allow goats to load very easily, certainly easier than loading sheep.

On the other hand, a bucket or other item left in or near a gateway will readily spook an approaching mob, indeed, the mob may even spook for no apparent reason thus making it difficult for them to proceed through the gateway. The solution is to "take it slow" and allow the animals to work out their own approach.

Goats generally develop a good relationship with farmers and may well approach (as with cows) a known handler to investigate what is happening. However, a mob used to one farmer may well spook if a visitor accompanies the farmer to examine a mob. There is also a difference between animals run under small hobby systems and animals run in larger mobs with less contact with humans. The extreme version of this is readily seen in feral flocks which move rapidly away from humans, presumably because of bad handling, hunting or extreme isolation. Bucks raised by larger studs which may run over 100 animals in larger paddocks with relatively little handling, can demonstrate quite wild behaviour both in shearing sheds and on release from transport after the sale of a single buck to a to small scale farm.

In the farming of all goat breeds, and Angoras in particular, an understanding of flock dynamics and individual behaviour is essential. Angoras need shelter especially after shearing and when kidding. Angoras generally stay in relatively tight mobs but are inquisitive and will exploit holes in or under fences. With fabricated fences with narrow pickets this can lead to problems. If such fence construction is to be considered, then the option is for wider pickets of the 90:6:30 type is essential. Smaller horizontal spacing created by steel posts can still trap animals.

Goats are wary of changed conditions. They tend to move away from people, but on farms, not that far, and may well approach to get a better look at the farmer. In yards, they move away a short distance but work well through pens without undue panic. Does separate from the mob to kid but can through habituation learn to kid in or around sheds used to pen them at night. Angoras respond well to humans, particularly if hand-fed with token rations.

Figure 10. Ring lock fences with narrow picket spacing are deadly to goats.

Exposure. Angoras (and to a lesser degree, sheep) suffer from exposure to wet conditions following shearing. Many losses occur when newly shorn animals experience wet and cold conditions usually at night. Not uncommonly, losses occur from the chilling effects of rain at the February / March shearing because unexpected storms trap animals away from cover. The reason for this vulnerability appears to be slow adaption of metabolic rate to the new "naked" situation. It may take as long as 2 weeks or more for metabolic rate to improve to an extent that body heat production can counter heat loss under cold wet conditions. Even then prolonged rain can still have significant effects causing serious losses.

Animals in advanced stages of **hypothermia** present a distressing sight and sound. Such animals have lost the ability to recover their body temperature and will die unless warmed externally. This, of course, is very difficult to organise for more than a few individuals.

Farming models vary greatly. In short, farming is whatever you wish it to be for you. But it is a matter of working out what's practical in the available environment. Perhaps there should be a profit motive but, even there, there may be other reasons for the farming activity to be selected and pursued. The important issue, though, is knowing what you want to achieve. The context of this book is that the major reason for farming Angora goats is **mohair production** which includes fibre quality as well as quantity. Farming for mohair is just not selective breeding. It is nutrition (stocking rate), timing of shearing and crutching, disease control (and other husbandry treatments on the flock) and weed control. This last factor is quite important since vegetable matter contamination can reduce the value of mohair almost to zero.

Stud or Commercial mixes. Before going into some of that, perhaps it's worth looking at the mix of animals and the way you want to run the flock. There is the traditional stud system which developed rapidly in the 1970's with animal registration based on pedigree. This model is still the basic system used in stud production. In theory, stud breeding, should have the product (mohair) as its main objective. Unfortunately, promotion via this success and a belief in show success as being the best test of quality has always confused the issue. The mere preparation of animals for shows conflicts with valid selection within a group of animals. Paddock run mates can rarely compete with prepared animals and visual characteristic which dominate show-judging say little about overall performance. On the other hand, visual characteristics (along with pedigree and stud reputation) still dominate animal selling.

However, just as show judging attempts (possibly unsuccessfully) to see past preparation, it also makes assumptions about fibre quality which might not be currently reflected in the market place. For instance, overlong fleeces are discounted by mills but supposedly demonstrate superior lock structure in fleece competitions. Longer fleeces also happen to weigh more (if fleece weight is one of the factors involved in judging).

This is not to say that pedigree tracking is not a valid part of stud breeding. It's just that I believe that performance under paddock conditions should be the major objective. Likewise, it can be argued that pedigree is irrelevant if you are applying valid **performance** comparisons and **selection** objectives. Under this model you can use syndicate sires in larger doe flocks and not be involved in recording sires and dams. Performance is the objective. This may allow larger enterprises to be run efficiently and almost by definition, this model is likely to outperform smaller enterprises relying on "backward looking pedigrees" and reputation based on show success.

On a third level, mohair production can be achieved from unrecorded animals including larger wether flocks. Under this model, large scale husbandry techniques in largely uncontrolled environments may well prove an efficient means of low-cost production.

Climate and environment constraints.

There may well be a number of constraints, but most people want to farm Angora goats where they live, and this has often brought the enterprise unstuck. Climate is a major issue. Angoras don't like cold wet conditions, but some forms of shelter may overcome these conditions. Angoras don't like hot wet conditions either. Such environments result in bacterial staining of the fleece and predispose animals to various parasite problems including the "summer worm" (***Haemonchus*** or Barber's Pole worm) and ticks which almost preclude farming the breed. Angoras are suited to dry conditions, especially if there is edible browse available but open pasture is not a problem if available in volume. Indeed, in Australia, open pasture in semi-arid areas may be the norm.

Figure 11. Trefoil has a tightly coiled burr which breaks up into eyelash pieces which tangle in the mohair and is difficult to comb out without fibre loss.

Figure 12. Large amounts of Trefoil burr are exposed during dry summers

A serious impediment to profitable fleece production is the **burr medic**, **Trefoil** (*Medicago polymorpha*), and there are many other weeds which result in fleece contamination as well. While there are methods of reducing such contamination, it may well be impossible because of the sheer scale of the problems. Trefoil is common in western NSW and various mediterranean environments. The burrs from this plant can coat the fleece though levels don't have to be nearly that high to create problems for processors. There are many other weeds including **Horehound, Bogan flee, Bathurst and Noogoora Burr**, and many species of **awned spear grasses**. All tangle in the mohair and for one reason or another result in severe price penalties at point of sale. In better times heavy VM content (over 7% by weight) could be removed from wool by the process of **Carbonizing,** which used concentrated sulphuric acid to remove water molecules from the plant cellulose, thus reducing it to charcoal which can be more easily removed. Unfortunately, this process is expensive and tends to destroy the lustre of mohair, so it is rarely used.

There are a number of problem weeds which result in "**fault**" in the fleece. Such fault results in a considerable discount on mohair at the point of sale depending on its severity. Control measures may be available involving herbicide sprays, strategic grazing, mowing and even chipping. Where the fault in the fleece results in more than 3% VM, it is not economic to attempt mohair production. Indeed, the general rule used in the trade is that mohair should not contain more than 1% fault. Roughly, this means if you can feel burr when clutching a fleece, it's more than 1%.

An important concept when attempting to reduce fault in mohair is considering grazing time and pressure. There may be certain paddocks and certain times of the year when grazing results in contamination. Adjusting shearing times may help; also crash-grazing with

sheep or cattle may also be effective and should be considered. Avoiding long pasture with seed heads when animals are approaching full fleece is imperative.

Land availability and value is a major issue. Fibre production (wool and mohair) is a low value form of production and by its nature is a form of extensive farming strategy. Semi-arid land is often of low value; indeed, Angoras farming, and mohair production may well be only one of a few true farming enterprises which is possible on such land. Predation will be considered elsewhere but the presence of **feral** (rangeland) goats in neighbouring paddocks or in adjacent national parks can be a serious problem to an Angora enterprise. This is because feral bucks can form into large herds capable of breaking down fences thus destroying breeding programs.

It would seem that a more general question in world agriculture is: "We have land which seems virtually worthless; what can we run on it?" Even in Australia there is the tendency of defining poor farming country as "Goat Country". Such "farms" often change hands quite often as individual owners discover just how difficult it is to achieve profitable income from these areas. In the traditional Angora farming areas round the world, goats seem to be that last resort option. Of particular interest are the goat areas of the **Karoo** (South Africa), the **Edwards Plateau** (Texas), the kingdom of **Lesotho** (South Africa) and the steppes of **Patagonia** (Argentina). All these areas have a certain similarity to the **Anatolian Plane** (Turkey), the origin of the Angora breed/strain of goat. There does not seem to be an equivalent similar farming environment in Australia, so farming Angoras requires some redefining of the farming approach if it is to take root and establish itself as a viable rural industry.

Soil fertility is often reflected by the types of plant which survive on particular soils. Land-use has often followed lines defined by plant cover but there are exceptions. Apart from specific soil deficiencies (eg copper and cobalt in the southern coastal belts of Australia) there is a relationship between production and general nutrient levels. Growth rate and absolute size of Angoras can often be traced back to the soil types but there are other factors as well such as plant nutrient retention in heavier rain fall areas. An observation can be made that animals grown east of the Blue Mountains in NSW are often small. Supplementary feeding can help but is often uneconomic except for special teams of animals. Just what is the limiting factor here is very difficult to determine.

The social aspect. Finally, there is the human and social aspect. While farming a fibre producing animal has the advantage of a durable product which does not degrade or spoil in storage, there is still the need for access to the market with transport of the rather bulky product at commercial rates. The supply of husbandry requirements and support (including the supply of breeding stock) impinges on individual enterprises. A farm (and farming) is not an isolated entity or activity. Infrastructure and communications are necessary. Even in South Africa it is noted that mohair production is largely confined to the Karoo (and Little Karoo) in the West and East Cape provinces. There is a huge area of South Africa which could produce mohair but marketing (in Port Elizabeth), transport, equipment, breeding stock, advice and agent support are confined to the relatively small semi-arid zone of the southern area of the country.

In Australia, probably because of the lack of clear production environment (low VM grazing country), and the special interests created by the natural fibre "fad" in the 1970's and 1980's, mohair production enterprises (and maybe, more obviously, Angora flocks themselves) are spread out and characterised by poor commercial support and a good deal of scepticism or as well, outright resistance by traditional graziers to the introduction of what are often considered "vermin". My father was attacked by a local grazier with the astonished cry "**what? goats in this good country!**" to which my father claimed to have replied, "**the better the country the better the goat**". Be that as it may, it has been very difficult to convince traditional farmers and graziers to look seriously at Angora goats and mohair production.