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Getting the best reproductive performance from does needs good management throughout the year. Good nutrition during lactation and during summer and autumn will increase the reproductive performance of breeding does by 15 to 30%.

Better reproductive performance will improve the profitability of growers, improve their chances of breeding better quality goats and will provide a better flow of stock to prospective new growers. Financial returns are maximised when the proportion of finer kid fibre in the clip is increased.

This article discusses management practices which affect reproductive performance, fertility and mating during autumn. Part 2 discusses the nutritional requirements for breeding does, supplementary feeding, trace mineral requirements and the effects of good and poor feeding on milk production, kid growth and mohair quality.

Table 1. Reproductive performance of Angora does at different body weights (USA data)

<table>
<thead>
<tr>
<th>Doe body weight at mating (kg)</th>
<th>Kidding%</th>
<th>Kids weaned#%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 27</td>
<td>76</td>
<td>59</td>
</tr>
<tr>
<td>27 - 32</td>
<td>102</td>
<td>62</td>
</tr>
<tr>
<td>32 - 36</td>
<td>117</td>
<td>81</td>
</tr>
<tr>
<td>36 - 41</td>
<td>143</td>
<td>115</td>
</tr>
<tr>
<td>41 - 45</td>
<td>147</td>
<td>117</td>
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Table 1 shows that 36 to 45 kg does produced almost twice as many kids as does weighing less than 27 kg and 40% more kids than does weighing 27 to 32 kg. A similar picture is seen in terms of the number of kids raised in the paddock where heavier does raise substantially more kids than lighter does.

The kidding performance of a flock of mixed age Australian cashmere goats grazed under commercial conditions (wheat sheep belt, annual rainfall 500 mm pa) is shown in Figure 1. These does were mated to inexperienced 18 month old bucks. The proportion of does which kidded increased from 56% for does < 20 kg body weight to 84% for does > 44 kg body weight.

The number of kids born per doe kidding increased from 1 at doe body weights < 20 kg to an average of 1.5 at doe body weights > 40 kg. This flock included old does > 44 kg which normally would be culled for age related faults such as broken mouths and no kids. The lower values for these old does shows what happens if these does are not culled.

Figure 1. Body weight and kidding performance of Australian cashmere does managed under harsh commercial conditions

Sould I Mate My Weaner Does?

Many producers wish to mate their does at the earliest possible age. The earliest potential age is at seven months. This procedure is not generally recommended as it can be costly. Mating at seven months of age is likely to reduce the lifetime kid production of the doe. Does at seven months of age may be sexually mature but their body weight and reserves of energy and protein are low.

Table 2. The effect of mating young does on their first kidding and on their life time kidding performance (USA data)

<table>
<thead>
<tr>
<th>Kid doe body weight at mating (kg)</th>
<th>First kidding %</th>
<th>Average lifetime kidding %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18</td>
<td>2</td>
<td>48</td>
</tr>
</tbody>
</table>
Table 2 shows that the kidding performance of does under 25 kg is very poor during the first year and that lifetime production is reduced by 10 to 40%. Up to 30% of does mated at an early age abort during the later part of pregnancy. Fortunately many small does do not conceive. Aborting young does waste a considerable amount of energy and protein which they would have used for their own body growth if they had not been mated.

The combined effects of pregnancy and lactation on the body development of young does may result in stunted growth. The end result of early mating is that you loose on the potential fertility in later life by trying to get a few more kids a year earlier. It is possible to mate at seven months and get 100% kidding but excellent feeding and management are essential. Generally it is advisable to wait until Angora does are 19 months of age before mating.

**Action:** If weaner does are mated they must weigh 25 kg or more. They must be given the best possible feeding during pregnancy and lactation. They will need energy supplements during late pregnancy and lactation.

**How Can I Get Heavier Does?**

To get heavier does at mating time:

- does must be grazed at the correct stocking rate
- does must be fed properly during lactation
- kids must be weaned at the correct time
- if needed fed energy supplements

**Graze at the correct stocking rate**

Recommended stocking rates are based on non breeding wether sheep commonly called "dry sheep". One dry sheep equivalent (DSE) is the feed required to maintain a 45 kg Merino wether for one year. The DSE of breeding Merino ewes is about 30 to 50% more than that of a wether ie:

1 breeding Merino ewe = 1.3 DSE.

This means that the stocking capacity of breeding Merino ewes, in terms of numbers of sheep which a farmer can safely graze, is 30% less than the number of wethers which can be grazed.
As breeding crossbred ewes are bigger sheep and more fertile than Merinos their DSE = 2.1 (when the lambs are sold at weaning).

What is the correct stocking rate for Angora does?

Mature Angora does weight up to 60 kg. The mean body weight of 3,000 Angora does in recent experiments in southern Australia was 45 kg. Angora does are shorn twice each year, thus increasing their exposure to cold stress compared to Merino sheep. Well managed does rear more offspring (100 to 120%) than Merino ewes (80%). The total energy requirement of Angora does are more than typical commercial Merino ewes.

The DSE rating of breeding Angora does is about 1.5 DSE plus 1.4 DSE per doe if kids are grazed until 19 months of age (mating age).

Consequences of grazing does above the recommended stocking rate.

Research has shown that grazing goats above the recommended stocking rate will:

- reduce body weight
- reduce body condition score and fat reserves
- increase deaths from cold stress
- increase internal parasitism during spring
- reduce doe body weight which will reduce kidding performance the following year

Grazing goats at high stocking rates is certainty not the correct environment in which to breed kids. At high stocking rates the potential kidding performance will be reduced as does will be lighter (up to 9 kg lighter at mating in February). During winter, when the foetus should be developing rapidly, does are under nutritional conditions which often prevent body weight gain. These conditions may increase the number of abortions and reduce kidding still further. Kids will also acquire heavy internal parasite burdens.

It is recommended that goats should not be grazed at intensities greater then 7.5/ha (3/acre) and any remaining grazing capacity be utilized by sheep or cattle.

Feed does correctly during lactation

If does are poorly fed during lactation they will loose body weight, weight which will be difficult to regain over dry summers. If does are well fed during lactation they can gain body weight during lactation. These issues are discussed in detail in Part 2 of this series.

Wean kids at the correct time
Ensure that last years' kids are weaned at least 2 months before mating. This will reduce any effects that lactation may have on reproductive performance and allow does to maintain or improve body weight. Most Angora does have almost stopped lactating by 13 weeks after kidding so the benefits to the kids of any milk produced at this stage are small.

| Surplus kids being sold for capretto production must not be weaned prior to sale. |

Buck kids should be weaned and separated from their mothers and sisters by the time they reach sexual maturity. Young rapidly growing buck kids will be unlikely to cause problems if they are under 4 months of age prior to the end of December, irrespective of their body weight. The ability of kid bucks to successfully mate increases at body weights > 20 kg.

**Feed energy supplements if necessary**

In Australian regions with annual pastures, pasture availability and quality is usually severely reduced by mid summer and autumn. On dry grazed annual pastures goats can lose body weight at rates up to 1 kg per week. So over a period of 2 months does can loose 8 kg. If summer rainfall results in a green pick and in regions of Australia with reliable summer rainfall or on irrigated pastures, goats will maintain body weight or grow.

If necessary, supplementary feeding of energy during the six weeks before mating is necessary to ensure that does maintain body weight.

| The best supplement in these summer drought conditions is energy, usually most cheaply provided by cereal grain. Cereal grain should be fed at the rate of 200 to 250 g per head per day. |

This ration will supply about half the energy requirements of the does and in most situations will prevent body weight loss.

When feeding grain to does for periods of greater than two to three weeks add:

- crushed limestone at the rate of 1.5%
- common salt at the rate of 1%
- mix all the additives in well with the grain

| If feeding 50 does 200 g of barley per head per day then to the 10 kg of barley add 150 g of limestone and 100 g of salt. |

The way to choose energy supplements and how to feed does is discussed in detail in Part 2 of this series [Goat Note B 13].

**When Is The Best Month To Mate?**
Angora goats can be naturally mated at most times of the year (in Australia, August to October is the most difficult period) but generally breeders mate their does from December to May. Natural fertility is highest in Autumn (March to May). Some Texan does have been reported to be very seasonal breeders and only easy to mate during autumn.

Hormonal treatments can induce autumn fertility with matings as early as December (advantages over untreated does could be up to 30%).

Deciding which month to mate is usually based upon:

- trying to avoid the worst weather conditions for kidding
- timing kidding so that does and kids can use the best pasture for rapid kid growth.
- minimising the risks from predators

In annual pasture areas kidding is usually preferred from May to July while in perennial pasture areas kidding is often planned for September to November.

The time from mating to kidding for goats is 150 days (5 months gestation interval).

**Mate During the Second Oestrus Cycle**

Goats have an oestrus cycle of 19 to 21 days. When the does are about to ovulate most of them show signs of "being in season" or some farmers say that the does are "on heat". These signs of oestrus include:

- wagging of the tail
- bleating
- mounting behaviour
- does seeking out bucks.
- red vulva
- moist exudate from the vulva

Sometimes on the first oestrus cycle of the year and with maiden does these behaviours are not so obvious.

Fertility of does is higher following mating at the second oestrus of the breeding season rather than the first or third oestrus. This is especially important for does mated early in the season. Research has shown that the ovulation rate of does in their second oestrus could be up to 15% higher than the ovulation rate of does in their first oestrus.

**Action** required to mate at the second oestrus is to expose does to a teaser buck for 7 to 14 days. This is then followed by the introduction of fertile bucks for the usual six week mating period.

Consult with your local veterinarian about operating on surplus bucks to
produce teasers (vasectomised or epididyectomised). The operation is quick and simple and must make the buck infertile. **This must be confirmed.** The bucks can be ready for use within several weeks. The use of teaser bucks is of great value to producers as does will often not come into seasonal oestrus unless bucks are placed with does. Teasers can be any crossbred Angora, crossbred Boer or cashmere buck.

**Action** have your vet produce a group of teaser bucks during late spring. Keep them with the bucks and use them over several years.

**Use The Buck and Doe Effect To Increase Synchronisation**

Does who are not in oestrus are responsive to the stimulus of active bucks (or teasers) and to does who are in oestrus. To get the best response to the buck effect it is important to keep bucks and teasers away from the breeding doe flock. Ideally bucks should be kept at least 200 m from the breeding doe flock and preferably further away during the 6 weeks prior to mating. When bucks are then introduced to the breeding does they will respond better with more uniform induction of oestrus.

Likewise the introduction of does in oestrus to a flock of does not in oestrus will stimulate oestrus activity and provide some natural synchronisation of oestrus activity. Consult your vet regarding methods to produce "hot does"

If does are synchronised you will need to increase the number of bucks present during mating.

**Managing Bucks**

Bucks can show sexual activity throughout the year but generally breeders only observe sexual activity in autumn. The number of successful matings by bucks is generally higher in the period January to July than for the remainder of the year. Bucks reach sexual maturity at about 40% of their ultimate mature size but they begin practicing at an earlier stage. This means most bucks they are fertile at about 18 to 20 kg body weight. It is usually best to grow bucks to about 19 months of age before using them in breeding programs. By this age you can more readily assess the bucks fleece quality and body development.

**Buck health is important**

Bucks must be in excellent condition at mating otherwise kidding performance could be depressed. Bucks must be capable of serving at least ten does each day when introduced during the second oestrus cycle of the breeding season.

**Action** is required several months before the breeding season to ensure bucks have:

- plenty of feed
lots of cool clean water
adequate shade during summer and in the time leading up to mating. If this is not done semen production will be reduced and sperm numbers may be inadequate for fertilisation of more than a few does
their feet regularly trimmed and kept in excellent order. Bucks place great stress on their hind legs and feet during mounting and if they are in pain from bad feet they will refuse to mate

Bucks should also be inspected for damage to the testes and penis. The testes should be soft and spongy and free of lumps. Wounds, cuts or abscesses could also render a buck infertile. Bucks which have been housed and fed rations with high protein (nitrogen) levels and diets with poor mineral balance could develop urinary calculi and other problems of the urinary tract. These problems have often been observed in show goats which have been "force fed" over summer.

**Action** have your veterinarian undertake a fertility test and advise you on a bucks likely breeding ability - an important test to undertake before purchase of an expensive buck. If purchasing a buck ensure that both testicles have descended as the breeding potential and value of cryptorchid bucks (with only one descended testicle) is considerably reduced.

**Using young bucks**

Young inexperienced bucks need to be given extra management to ensure that they get on with mating. Young bucks may wish to go walkabout and rejoin the buck flock again.

**Action** young bucks should be confined in yards or small secure paddocks with mature does in oestrus. Some practice with does in oestrus will help. When the young bucks show interest in mating and staying with the flock they can be put into larger paddocks.

**How do I know if the bucks are working and the does are mated?**

The best method of checking if bucks are working is to use mating crayons such as "Sire Sine". Bucks are fitted with a harness which has a coloured crayon over the breast bone. When a buck mates a coloured mark is left on the rump of the doe. This equipment can be purchased at Stock and Station agents.

It is essential that the harnesses are correctly fitted. If harnesses become loose they will entangle the legs and prevent mounting. Harnesses must be inspected frequently and adjustments made, preferably before the proper mating period begins.

Records can be kept of when does are mated. By changing the colours of the
crayons every 21 days it is easy to determine when does have conceived.

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