



GOATS AND PASTURE

MEAT & WOOL

NEW ZEALAND

June 2005

QUALITY

Good grazing management is about having enough of the right quality feed to allow stock to achieve their target performance, doing it in a way that enhances the natural ability of pasture to grow, and at the same time, minimising feed wastage.

Pasture quality is constantly under threat. The natural tendency for pasture to set seed in late spring, and the senescence and decay of growth always set a limit on stock performance.

Incorporating goats in the grazing programme with sheep, cattle and deer can create complementary benefits of:

- improved stock productivity
- increased pasture quality and production
- fewer pasture weed problems
- additional income from goat products

Importantly, because goats graze differently to other stock, it may be possible to add goats to the grazing system without any reduction in the number of other stock.

What Goats Graze

Goats have the advantage over sheep, cattle and deer, that they prefer a varied diet, and have the habit of browsing and selecting roughage in their diet.

Although they select and graze lower quality feed, goats do not appear to differ from sheep in their ability to digest a low quality diet. Goats are able to do well on what appears to be low quality forage because of their grazing habit, not through any advantage in digestion. There is little doubt that, like sheep and cattle, high performance will only be attained when goats achieve a high intake of high quality forage.

Like other stock, goats select from the range of feed on offer, with the differences in intake largely reflecting pasture height and feed quality.

Studies (Gong 1996) indicate that while sheep selectively graze the high quality parts of the sward, goats are much less discriminating. Sheep penetrate down into the pasture, especially as it matures into flowering and seed-head formation stages. As a result of their more penetrating grazing habit, sheep select from the lower levels of the sward where clover is more predominant.

In contrast, goats graze pasture from the top down, and appear to graze tall feed, especially seed head, from the

side. As a result, they do not graze down into the base of the pasture as readily, and this may explain the swards increase in clover content in goat grazed swards.

While another possible explanation for the improved clover content of goat grazed pasture is that goats may actually avoid grazing white clover in a mixed sward, this has yet to be demonstrated.

Goats more readily graze seed head and stem material and develop a more even appearance to the pasture than sheep.

Pasture Height

Pasture height is one of the critical factors affecting diet selection by goats. It also has an effect on how easy it is for stock to achieve their required daily feed intake.

There are important differences between cattle, sheep and goats in the way they cope as the height of pasture they are grazing decreases, (Colins and Nicol 1986). Their results indicate that as pasture height decreases, goats are least able to maintain their daily feed intake. Cattle were capable of maintaining a high level of feed intake as pasture height declined. However, goats suffered the greatest reduction in daily feed intake as pasture height declined to 1500 kgDM/ha. These results also indicated that compared to sheep, goats were less able to maintain their intake when there was a slow decline in pasture height, as in set stocking.

In comparison, when pasture height was quickly reduced, as in mob grazing, there was little difference between the performance of goats, sheep and cattle.

These results have implications for feed allowance and grazing management of goats, particularly when high performance is to be achieved. Studies by McCall have confirmed the benefits of offering around 2000 kgDM/ha or better on goat live weight gain (*table 1*), fecundity and fertility (*table 2*), and parasitism as indicated by the requirement for drenching (*table 3*).

Table 1 Effect of Pasture Mass on Feral Goat Liveweight Gain (Mid October - Mid January)

	Pasture Mass (kg DM/ha)		
	1600	2000	2500
Doe (g/d)	-14	-5	15
Kid (g/d)	54	71	81



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Table 2 Effect of Residual Pasture Cover on Cashmere Hogget (Performance (March - July))

Residual Cover (kg DM/ha)		
Performance indicator	2000	1200
Attainment of Puberty (%)	69	38
Pregnant (%)	42	26
Down Production (g/hd)	59	54

Table 3 Impact of Pasture Mass on Internal Parasite Management

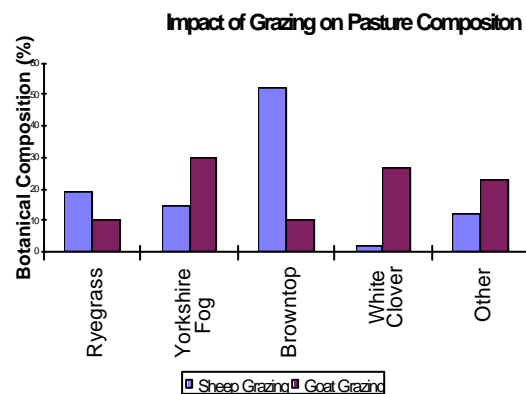
Percentage of Does Drenched		
Pasture Mass kgDM/ha	Once	Twice
1600	80%	30%
2000	63%	10%
2500	53%	0%

PRACTICAL IMPLICATIONS

THE IMPACT ON PASTURE QUALITY

The end result of goats different grazing preference is an improvement in the proportion of desirable species in the pasture (Figure 1) and a reduction in the level of seed head and top litter.

Figure 1



The beneficial effect of goats on pasture quality becomes even greater when the pasture they graze is moved from easy contour to steeper hill country. In steep hill country, the slope is separated into widely different zones, including camp sites, tracks, steep inter-track areas, and intermediate slope zones.

There are often wide differences in productivity of each of these areas, with the steeper inter-track zone having predominantly lower fertility, low digestibility pasture species which are low in grazing preference for sheep or cattle. Goats however, can contribute significant benefit

through their habit of spending up to 50% of their time grazing these steeper areas (Table 4) Lambert.

Table 4 Effect of Slope on Grazing Behaviour
Proportion of Time Spent Grazing Zones

Zone	Goats	Sheep
Camps, Tracks, Slopes	53%	97%
Steep Banks	47%	3%

It is necessary to note the different components that contribute to low quality feed and dead matter in pasture. So far most of the comments about pasture quality and goat grazing behaviour refer to seed head and top litter. The other component is the growth that ages and accumulates in the base of the pasture as decaying vegetation. Over summer and autumn this is significant, especially in summer moist environments.

Goats do not prefer this and if they are forced to eat this low quality feed, their performance will be significantly affected. An appropriate management option is to graze cattle, or sheep to remove this accumulation.

EFFECT ON PROFITABILITY

The benefit from farming goats is greatest when they are grazed in conjunction with other stock types and their differences in grazing preference and habit are exploited.

The benefits from incorporating goats into the grazing system for a bull beef unit are illustrated in Table 5, Thomson and Power (1993).

Table 5 Productivity from Integrated Grazing of Friesian Bulls and Angora Does

	3	3	3
Bulls/ha	3	3	3
Does/ha	0	7	13
Stock Units/ha	15	21	26
Pasture Production (DM/ha)	9520	10300	11520
Bull Sale Weight	480	480	470
Doe Fleece Weight	-	3.0	2.9
Kid Weaning Weight	-	13.5	12.1

* 1 bull = 5 su

** 1 doe = 0.8 su

In this trial, the addition of Angora does resulted in a supplementary effect. There was no increase in bull beef production. But the does and kids were able to be farmed without any reduction in the bull performance or



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numbers, suggesting that the goats were grazing different components of the sward and were therefore synergistic. Additionally, the goats achieved effective Californian thistle control.

Substituting some wether goats for ewes resulted in similar or greater total lamb production from integrated grazing compared to a sheep only grazing system in Canterbury (Townsend, 1990). Integrating goats into the ewe and lamb grazing system significantly increased the clover component in pastures, and lamb liveweight gain, even when the goat ratio was as low as 1 goat to every 3 ewes. Increasing the ratio to 3 goats to every 3 ewes further increased the proportion of clover and lamb performance *Table 6*.

Table 6 Effect of Goat Grazing on Lamb Growth

	Ewe: Goat ratio	Lamb liveweight gain (g/day)		
		Pre wean Oct-Nov	Post wean Dec-Mar	Total Oct-Mar
Sheep only	3:0	225	111	152
Low goat	3:1	210	146	169
Medium goat	3:2	235	158	185
High goat	3:3	235	185	203

There is little research on the benefit of integrating goats into the grazing programme for a dairy herd. However, farmer experience confirms that farming one goat for each dairy cow has benefits in pasture weed control, and pasture quality. A set stocked grazing system for goats is easily managed, and a summer-autumn grazing programme would be expected to achieve profitable weed management.

Grazing Management

This has been summarised by Lambert (1980) and McCall (1987) and is based on studies with farmed feral goats.

When breeding goats and young goats are feeding on pasture **alone**, they require tall (up to 7 cm) high-quality pasture in order to achieve high intakes and perform well (McCall 1987). Practical guidelines for achieving high levels of goat performance have been summarised by McCall, *Table 7*.

Table 7 Pasture Residual Cover Targets

April to late August		
Does	4 cm	(1300 kgDM/ha)
Hoggets	5 - 6 cm	(1800 kgDM/ha)
September to December		
Does (and kids)	5 - 6 cm	(1800 - 2000)
Hoggets	4 - 5 cm	(1600 - 1800)
January to April		
Does	5 - 6 cm	
Kids	5 - 6 cm	(1800 kg DM/ha)

Recommendations are to graze no closer than 4 cm in winter. At this height doe performance is limited to a small degree, but subsequent kid birth weight and survival is not reduced.

It is better to limit intake at this stage and carry pasture forward for feed during lactation. In contrast to does, ewes can be grazed as low as 0.5 to 1.0 cm in early pregnancy, and 1.0 to 1.5 cm in late pregnancy and still meet their intake requirements. Does, however, will not readily graze below 2 cm.

Lactation feeding should aim to maximise doe and kid performance. To achieve this, high quality pasture which has a minimum 80% green leaf content with post grazing residuals no less than 5 to 6 cm is required. In contrast, at this time ewes can be grazed on 2 to 3 cm high pasture.

In order to achieve long pasture for lactating goats, kidding needs to be later in spring (e.g. late September) than lambing which may be from late August through to early September.

High rates of kid or hogget growth are achieved on leafy, green pasture having a residual grazing height of about 5 cm.

These targets reinforce that high productivity from goats on sheep farms is difficult to achieve without preferential feeding of the goats.

This can be most successfully achieved with an integrated grazing system with the order of grazing preference arranged as kids, lambs, does and ewes. It



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can also be successful when integrated with cattle grazing on longer pastures.

Stock Unit Equivalence

The stock unit equivalence system is most satisfactory when used for a single grazing animal species. When used across species, problems are encountered with differing seasonal feed requirements due to different lengths of gestation and lactation, and time of parturition, as well as differences in accessibility and acceptability of forages. Goats and sheep are similar in terms of seasonal feed requirements, but both sheep and cattle differ markedly from goats in grazing behaviour where forage type and topography is variable.

If goats obtain a significant proportion of their diet from plants or parts of plants not grazed by sheep and cattle, the stock unit system is ineffective. Similarly, goats can more efficiently graze steeper slopes that are less effectively grazed by other livestock. Where browse plants are present, the topography is variable, and stocking rate is low, inclusion of goats in a sheep and/or cattle system may actually have no negative effect on, or even increase performance of the other animal species.

In contrast, on a flat, intensively grazed site with a botanically simple pasture, goats will compete directly with other livestock and the livestock equivalence system will be more applicable. Liveweight becomes the measure of comparison.

However, there is much greater variation between goat liveweights at similar ages than with sheep, and between goat breeds. For example, adult does can vary from 20-50 kgs and yet still be called a goat.

A check list of points to consider in planning the integration of goats into livestock systems includes:

- targeting a maximum of 10% of total stock liveweight as goats.
- on dairy farms, allocating up to one goat per cow.
- using supplements and browse plants strategically, especially when pasture height is low in late winter and early spring to ensure adequate feed intake.
- ensuring a high level of feed on offer to achieve high production.

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