G2001/Q14

Producer Research Support

Sustainable Meat Goat Management

South Queensland Goat Meat Producers

Members of the South Queensland Goat Meat Producers have moved away from feral goat harvesting to developing a breeding herd. They have realized that the goats require careful management in order to achieve optimum production levels.

Although hampered by two bad drought years, the group has learned about goat management and vegetation monitoring, and seen the benefits of photo monitoring. They have been surprised by faecal analysis results and have to rethink assumed views about what goats eat.

The standout factor for driving profitability in a goat meat enterprise is the percentage of offspring sold per breeding doe.

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The project

The Queensland Goat Meat Producers, all previously sheep or cattle producers, identified that goats eat a different range of plants, and are able to sustain a higher stocking rate than sheep or cattle.

The group members wanted to measure the quality and amount of feed required by goats, identify profit drivers, and determine the profitability of a goat enterprise in comparison to their sheep and cattle enterprises.

Objectives

1. develop a measure of available feed;
2. determine goat meat enterprise profitability; and
3. determine a sustainable stocking strategy to optimise the profitability of a goat meat enterprise under different conditions.

What was done

A process for understanding and measuring the eating habits of goats was established:

1. identify a representative monitoring site for each major land type where goats grazed;
2. take regular photos at these sites as the seasons changed; and
3. collect dung samples from the goats (where photos were taken) and send to lab for analysis to ascertain what the goats were actually eating.

This process was intended to determine what the goats ate, compared with paddock vegetation composition at the time of sampling. After some discussion, it was agreed that a photographic site would be considered suitable if it was representative of the paddock or country type.

The vegetation monitoring procedures used were:

1. identify the major land types on each property;
2. select reference points in each land type and mark with a steel post; and
3. take photographs of the vegetation (at least one for each season) from the same place at each of the reference points;

Photographs were stored chronologically with associated data about site location, date, stock numbers and type in the paddock, rainfall since last photo and any other factors that may have influenced vegetation development.

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Key points

- The standout factor for driving profitability in a goat meat enterprise is the percentage of offspring sold per breeding doe.
- One producer was able to increase his number of sale goats (compared to breeding does) to 135%, which positively impacted his goat meat enterprise profitability.

Dung sampling procedures followed were:

1. Collect soft dung samples from goats in the paddock. Black and shiny dung is the second best option. Avoid collecting excess plant material and dirt with the dung samples.
2. Collection equipment included a 10 litre bucket, plastic bags and a mug.
3. Collect fresh dung as close to the monitoring sites as possible, at a similar time to when the photos are taken. Samples were collected at least three times per year, collecting enough dung from each site to fill the bucket at least two-thirds full. The bucket contents were mixed well and a sub-sample of two mugs full taken and dried in the sun. Dry samples were sealed in a plastic bag and sent to the laboratory.

The first two to three sample sets were sent to the Department of Primary Industries (DPI) laboratory at Charleville, but this service was not available for the last part of the trial. The last sample batch was sent to the CSIRO Davies Laboratory at Townsville where faecal NIRS and phosphorous analyses were performed.

The photographs provided participants with a visual assessment of how vegetation changed at different sites over time.

Procedure For Analyzing Goat Enterprise Profitability

Calculation of the gross margin on sales for the last financial year (2003/04) was used to determine the profitability of each producer's goat meat enterprise.

Per head production expenses were estimated, because these costs were often incorporated into sheep and cattle expenses and difficult to isolate.

The figures were applied to the total goat herd, and the dry stock equivalent (DSE) of the herd calculated. Calculation was based on group members' knowledge of the DSE of sheep.

Table 1. lists the DSE ratings used for different goat types.

Table 1. Goat Herd DSEs

Goat Description	DSE Rating Used
Wether/Dry Female	0.75
Doe with Kid	1.00
Weaner < 12 months	0.50
Buck	1.00

Group members identified that gross margin can be distorted if sales are carried over from the previous year, or if there is a drought or sudden change in market prices.

The gross margin for a particular enterprise should not be taken out of context because it forms only part of the whole farm profitability.

What happened?

Photo Site Monitoring

Three group members provided photos from several sites on each of their properties over the project period. The photos showed variations in individual sites over time, especially when significant rain was also recorded. There was a drought during the first two years of the project and it was difficult to identify any noticeable trends in goat feed preference, mainly because the goats had no option but to eat what was available.

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Producer Research Support

MLA Producer Research Support offers support funding of up to $15,000 over three years for groups of producers keen to be active in on-farm research and demonstration trials.

These activities include:

- Producer Initiated Research and Development
- More Beef from Pastures demonstration trials
- Prime Time Wean More Lambs demonstration trials
- Sustainable and productive grazing grants.

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The composition of the vegetation varied between sites and properties, but the most interesting observations were made from the same site. This photographic data was valuable when compared against the time of year, type of stock grazing, approximate stocking rate, rainfall records and dung sample results.

Group members identified that grass and shrub species were being eaten at different rates and some had been chewed out, while others were hardly touched. Coming out of drought, goats concentrated on herbage and browse. This allowed grass species to regenerate at a much greater rate than paddocks grazed by sheep and cattle over the same period.

Faecal Sample Results

Producers viewed photos of the sites (did not visit the site or view the whole paddock), and made an estimate of what percentage of browse, forbs or grass a goat would have consumed at that time.

The first set of results was most interesting because they were different to what producers expected, having observed the corresponding photos.

Table 2. A Comparison of Group Member Estimates and Actual Lab Results

	February 02		July 02		June 03	
	Estimate	*Actual*	*Estimate*	*Actual*	*Estimate*	*Actual*
Browse %	70 - 80%	29%	75 - 80%	14%	40 - 75%	8%
Forbs %	15 – 40%	55%	20 - 25%	85%	20 – 50%	72%
Grass %	5 – 10%	16%	0 - 5%	1%	0 – 10%	20%

The main differences occur between the amount of browse and forbs expected to be eaten by goats. There are several possible conclusions that may be drawn from these results:

1. visual appraisal or assumption of what goats are eating by group members, is not very accurate;
2. producers interpret what species are included in the browse, forbs and grass classifications differently;
3. identification of the species at the laboratory is not accurate;
4. results are difficult to interpret because there was only a limited amount of vegetation available, and smaller species may have been difficult to see in the photos; and
5. more tests are required to build a larger data set and obtain more robust outcomes.

Group members identified that more testing was required over a range of different conditions, to build a greater results database. The last lot of samples were sent to the CSIRO Davies Laboratory in Townsville for NIRS and phosphorous tests, where the NIRS model is set up for cattle tests. The laboratory could not guarantee the predictive reliability of the results presented for goats.

The laboratory commented that, "The predicted diet quality was very high in protein and high in digestibility, which is understandable since the prediction indicates that >70% of the diet is non-grass. Therefore it would be fair to assume that the diet at this time was mainly herbage and maybe a little bit of browse. If the goats were eating a lot of browse you would expect the predicted digestibility to be a lot lower." These results are summarized in *Table 3.*

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Table 3. Faecal NIRS Predictions from Samples Taken in June 2004

	Dietary CP%	Faecal N%	Digestibility%	Non Grass%
Sample A	11.8%	1.60%	65%	78%
Sample B	12.5%	1.57%	61%	70%
Sample C	Not ready at this time			
Sample D	Not ready at this time			

These figures correlated well with group member estimates of what goats were eating, as show in *Table 4.*

Table 4. Comparison of Group Member Estimates Against NIRS Results

	Estimated Range	Estimated Median	Actual NIRS Results	
Browse %	10 - 30%	26%	20%*	* Estimated from
Forbs %	35 - 60%	50%	54%*	NIRS results
Grass %	20- 35%	27%	26%	

Gross Margin Analysis

The gross margin analyses demonstrated a wide range in returns and expenses between group member properties. These results were also compared with gross margin analyses conducted by almost the same producer group in 2001.

The main features of the analysis were:

- The average income was between $8 to $10 per dse, but one producer showed a staggering return of $28/DSE. The main reason for this high return was that he had a very high percentage (135 percent) of sale goats to breeding does. The rest of the group averaged less than 50 percent. This high sale percentage was thought to be due to timely rainfall, and that young female goats can have a kid on the ground by the time they are one-year-old. A severe drought in 2002 and 2003, has meant higher than normal losses and prevented does from cycling properly, reducing kidding percentages.
- Variable expenses have halved since 2001 as producers have realized that goats don't need much attention or treatment if given enough room and a reasonable spread of vegetation. Two years of drought has meant producers have actively reduced costs.
- The gross margin of $11.24 per dse improved on the 2001 results by 17 percent, largely the result of reducing costs.

The standout factor is that the percentage of offspring sold per breeding doe greatly impacts the profitability of the goat meat enterprise.

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Management Implications

In the past, group members have used goat condition, rather than vegetation condition as a cue to alter management regimes.

The faecal tests have shown that there is disparity between what producers think goats eat and what they actually eat. Producers therefore intend to continue with periodic faecal testing to inform decisions about stocking rates and movement.

The photo monitoring enables producers to develop a database of what vegetation goats prefer in different seasons, and how this will affect the landscape. It is important to continue the monitoring to be able to build an accurate history of what is happening.

Discussion

The project group consensus was that more testing over a range of seasonal conditions, would enable a greater database of results to be produced. Because the NIRS model at the CSIRO Davies Laboratory is set up for tests on cattle, there was some concern about the predictive reliability of the results presented for goats.

While producers have not quantified the amount of feed available, a process of visual recording and scientific analysis of faeces has been developed. This builds a subjective, but comprehensive understanding of what the goats are eating and what impact it is having on the landscape.

The group has not yet ascertained predetermined stocking strategies for different country types. The main reason for this is that similar country types at different locations may be in vastly different condition - amount of timber, regrowth, improved pastures, etc.

Producers identified methods to determine sustainable stocking strategies:

1. monitor of the condition of the vegetation (from photos and site observation) to determine how key species are being affected;
2. monitor what the goats are actually eating. If goats are eating predominantly browse and there is plenty of browse and not much grass, then the goats may be able to stay at a certain stocking rate longer than sheep or cattle; and
3. monitor goat condition, because it indicates how well the goats are performing in a certain paddock at a given stocking rate.

If the first two techniques are correctly applied, the producer should be able to make the necessary adjustments to stock numbers before there is any adverse effect on goat condition.

Goat meat enterprise gross margin was strongly influenced by drought conditions. This analysis is a useful snapshot of performance, but doesn't capture the intangible benefits of controlling regrowth or the benefits of complementary grazing with cattle.

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