Information Sheet

ADVANTAGE FEEDERS

MAXIMISING WINTER STOCKING RATE BY HIGH PASTURE UTILISATION IS A KEY DRIVER FOR ANNUAL PROFIT

Winter pasture growth rates in most areas is slow which makes it challenging to carry enough stock through this period to utilise spring growth and dry feed (particularly stubbles) over summer and autumn.

Supplementing with starch and effective fibre when pastures are new and in their vegetative state allows farmers to drastically increase their stocking rates and, generally, carry more stock year-round to increase total production.

Winter pasture has two main issues. Firstly, pasture growth rates in most areas slows in winter, making it challenging to carry enough stock through this period while having enough to utilise spring growth and dry pasture, particularly stubbles, over summer and autumn.

Secondly, the low NDF (Neutral Detergent Fibre) in the pasture means that it breaks down in the rumen quickly and a large component of it can escape before the microbial population have utilised its nutrients.

Because of these issues, supporting the rumen with the correct supplement feeds can make a large improvement in pasture utilisation, stocking rates and annual farm production. Benefits can also be enhanced for mixed enterprises that have areas of their property allocated for crop production during winter and then have crop residual to consume in summer and autumn.

Mixed enterprises stand to gain the most from balancing high moisture pastures

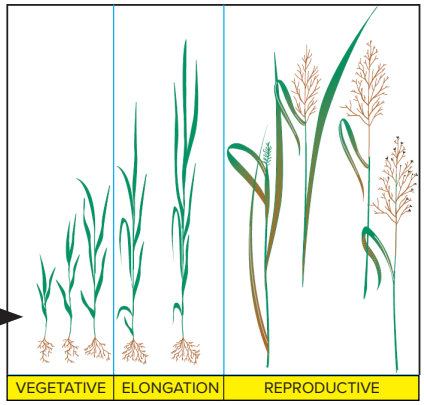
In most supplementary feeding applications, the production benefits are gained in the period of feeding. In the application of managing high moisture pastures, there is a benefit of higher pasture utilisation however, the majority of the benefits of running more livestock during winter are realised when the additional maternal stock can produce more offspring or more stock can be carried through to the spring and summer pastures to utilise this growth and then be marketed.

The majority of the benefits from balancing moisture pastures are received in the period after feeding

LIMITATIONS OF HIGH MOISTURE PASTURES

Plants in the vegetative phase have a high moisture content.

Managing high moisture pastures occurs when the pasture is in the vegetative phase



Limiting factors of grasses at this time:

- Pasture is poorly digested. High moisture pastures offer low dry matter and low NDF (total fibre). The result is an increase in the rumen turnover rate allowing for an increase in consumption/intake, but because the rate of passage is much faster, less time is available for microbes to digest the feeds and nutrients can escape adequate fermentation in the rumen.
- Livestock may not meet effective nutritional requirements. High moisture pasture means that livestock may not be able to consume enough pasture to meet requirements. This is most important to pregnant and lactating livestock.
- The rumen requires a fibre mat for proper functioning.
  - The low fibre level means that the pasture is not retained in the rumen for long. Promoting a fibre mat (the section in the rumen below the gases and above the liquid section) is essential to ensure the feed is retained in the rumen and utilised by rumen microbes. Slowing down digestion also improves rumen pH and enhances rumen health.
  - The amount of microbial protein flowing to the intestines depends on the availability of energy in the rumen. If there is not enough energy (fermentable carbohydrate, i.e. starch) the soluble protein, pasture is wasted in the rumen and this will impact production.
  - Lack of effective fibre in the diet reduces saliva production. This in turn leads to inadequate buffering, lowers the rumen pH level and leads to issues of sub-acute acidosis and deterioration of microbe populations.

The faeces of livestock can provide indirect evidence of a lack of fibre in the diet. Faeces rating systems range from 1-5 with 1 having a high liquid content and 5 being very firm. The images of score 1 and 2 of sheep faeces below are examples of poor rumen digestion resulting from, among other factors, reduced microbial cellulolytic activity (due to lack of fibre) contributing to degrees of diarrhoea and wasted feed. Manure scores of 3 or above will generally mean that the ruminant is effectively extracting the nutrients from the feed. For a range of cattle faeces images with scoring, see www.fwi.co.uk/livestock/livestock-feed-nutrition/carry-cow-muck-assessments

Thin and watery manure is a lost opportunity to extract nutrients from pasture

THE BEST FEED TO MANAGE HIGH MOISTURE PASTURE

Plants in the vegetative phase have a high moisture content and high soluble protein.

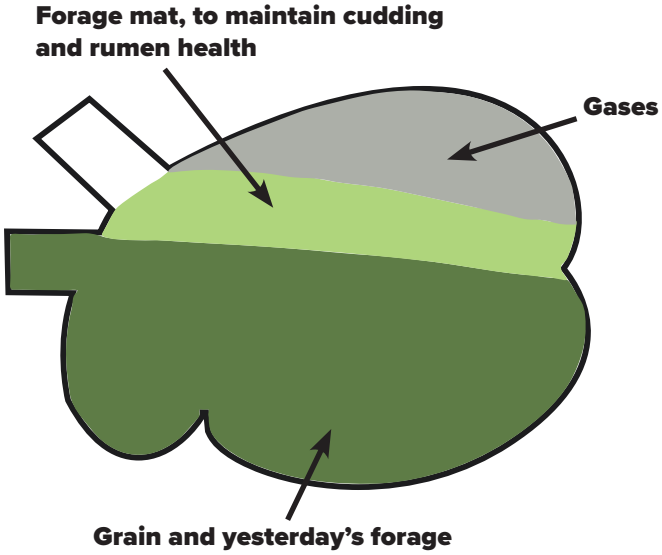
Two types of feed are needed to balance the diet:

1. A source of fibre. This improves the functioning of the rumen and slows the passage of feed.
2. A source of starch. With supplementation of fermentable carbohydrate allows more soluble protein to be converted to ammonia by the microbes in the rumen converting it to microbial protein to be utilised

Common feeds are:

- Straw, hay and silage for the source of fibre
- Pellets, barley, wheat or oats for the source of starch

THE RUMEN CONTENTS



CLASSES OF STOCK TO PROVIDE A HIGH RETURN ON INVESTMENT

Managing high moisture pastures in stock that can't meet their nutrient requirements from pasture provide the highest return on investment. Commonly, these are pregnant and lactating animals. However, all classes of stock that are supported so their rumen will digest pasture more efficiently will lead to more pasture being available on a farm.

ESTIMATING THE REDUCTION IN PASTURE CONSUMPTION AND INCREASED STOCKING RATE

There are several experiments that have measured pasture consumption when a group of stock have been supplemented to manage high moisture pasture.

- Wyeth – stocking rate increased by 50% in winter
- Laidlaw – stocking rate increased by 85% in winter
- Veale – stocking rate increased by 50% in spring

ADDED PROFITABILITY OF RUNNING A HIGHER STOCKING RATE

It is a complex assessment to calculate the added profit generated from a higher stocking rate because there are some added costs with having more livestock and it varies depending on the mix of cropping and livestock production.

Benefits:

- Added production in spring and summer from running a higher stocking rate
- Increased milk production of maternal animals increasing infant survival and growth rates
- Fewer issues in late pregnancy, giving birth and early lactation leading to higher maternal survival.

After adding additional costs of running 50% higher stocking rates, the extra stocking rate can often double profit/Ha

THE PERIOD FOR FEEDING LIVESTOCK TO MANAGE HIGH MOISTURE PASTURE

Commencement

For managing high moisture pastures, it is common for this supplementary feeding period to commence approximately three weeks after the break of the season, when pasture is short and actively growing but not yet at adequate levels for livestock to consume enough for their requirements.

Completion

This occurs when the fibre in the diet increases to a level where pasture growth exceeds the nutrient intake of the livestock.

This generally happens at:

- the start of the spring flush as plants are in the elongation phase.

Note: in the later stages of this supplementation period when pasture growth is outstripping consumption, a forage alone could achieve the benefits of improving the functioning of the rumen without the added cost of a starch based feed. However, if the livestock have high production goals, like most weaned animals, a starch based feed will manage the excess ammonia in the rumen and lead to higher growth rates. See the "Managing Excess Protein Information Sheet".

THE COST OF THE ALTERNATIVE TO MANAGING HIGH MOISTURE PASTURES IS RUNNING STOCK IN CONFINEMENT OR SACRIFICE PADDOCKS

The benefit of the higher stocking rates grazing pasture need to be compared against the alternative, confinement feeding.

Working out the cost of confinement feeding is a complex question. Livestock need a wide variety of energy, protein, mineral and vitamin needs based on whether the objective for stock is to put on weight, hold weight or lose some weight. Other factors include the pregnancy status of an animal and the quality and availability of paddock feed. Consult a livestock nutritionist or farm consultant for expert advice.

Note that confinement feeding may not be a practical alternative when maternal stock are in late pregnancy, lambing/calving or lactating.

Energy can often be the limiting factor in a diet. Energy requirements for livestock can be found on the following links:

- *www.lifetimewool.com.au/Tools/dryfeedbud.aspx*
- *www.futurebeef.com.au/knowledge-centre/nutrient-requirements*

Formula to work out cost of energy:

$$\text{Daily cost of feed/head} = \text{Price (per tonne as fed)} \,/\, \text{Energy density (MJ/kg of dry matter)} \,/\, \text{Dry matter (\%)} \,/\, 1000$$

Examples for a range of feeds:

1. A sample of barley is $225 delivered, it has 12.5MJ/kg of DM and the feed is 90% DM. The price of energy is $225 / 12.5MJ/kgDM / 90% / 1000 = $0.0200 per MJ
2. A sample of cereal hay is $175 delivered, it has 10MJ/kg of DM and the feed is 88% DM. The price of energy is $175 / 10.0MJ/kgDM / 88% / 1000 = $0.0199 per MJ
3. A sample of straw is $100 delivered, it has 6MJ/kg of DM and the feed is 90% DM. The price of energy is $100 / 6.0MJ/kgDM / 90% / 1000 = $0.0185 per MJ

In these examples, barley, cereal hay and straw are all showing an energy cost of approximately $0.02 per MJ.

Note: these amounts don't take into account a small component of feed wastage that is present when feeding hay and straw.

Formula to work out a daily feed costs:

$$\text{Daily cost of feed/head} = \frac{\text{Price}}{\text{MJ}} \times \text{Daily energy requirement (MJ)}$$

Examples for a range of feeds:

1. A 60kg (large frame) ewe needs approximately 12.9MJ of energy at 100 days of pregnancy. At $0.02/MJ, this is a supplement cost of $0.26/day. The costs of ordering, storage and feeding it out are likely to add 15% so the total cost is $0.30/head/day
2. A 550kg cow, holding condition needs about 64MJ of energy in the last third of pregnancy. At $0.02/MJ, this is a supplement cost of $1.28/head/day. The costs of ordering, storage and feeding it out are likely to add 15% so the total cost is $1.47/head/day

CALCULATING THE DIFFERENCE IN FEED COSTS FROM MANAGING WITH HIGH MOISTURE PASTURE WITH SUPPLEMENTATION COMPARED TO CONFINEMENT FEEDING

WANTING TO TRY OUT THE CALCULATORS FOR YOURSELF?
Visit our website
www.advantagefeeders.com.au/roi/high-moisture-pastures

THE RECOMMENDED SUPPLEMENTARY FEEDING AMOUNT

A common understanding with most farmers is that when stock have sloppy faeces they need to have fibre added to their diet. There has been a lack of scientific research to link the amount of fibre and fermentable carbohydrates needed to supplement a range of pastures based on digestibility (how fast they break down) and the moisture levels.

In addition, there is a wide range in quantity required to be fed to stock based on whether the objective for livestock is to put on weight, hold weight or lose some weight. Other factors include the pregnancy status of an animal and the quality and availability of paddock feed. Consult a livestock nutritionist or farm consultant for expert advice on quantity and type of feed to supplement.

Common concentrate supplement amounts:

- Weaned sheep: 100-200g/day
- Mature sheep: 200-400g/day
- Weaned cattle: 1-2kg/day
- Mature cattle: 2-4kg/day

Common forage supplement amounts:

- Weaned sheep: 50-100g/day
- Mature sheep: 100-200g/day
- Weaned cattle: 0.5-1.0kg/day
- Mature cattle: 1.0-2.0kg/day

STOCK PER FEEDER IN THIS APPLICATION

200 sheep per grain feeder, Sliding Gates Hay Feeder or Extended Cradle Hay Feeder is recommended.

50 cattle per grain feeder, Sliding Gates Hay Feeder or Extended Tray Hay Feeder is recommended.

Like all applications, the amount of stock/feeder can be increased but it increases the risk of uneven consumption because there is more competition for trough space. The increase in risk requires more oversight/management to identity a potential unevenness in feed consumption.

Recommend 200 sheep per feeder

Recommend 50 cattle per feeder

CONTROLLING THE RATION TO ACHIEVE A SMALL DAILY INTAKE

Forage component of the supplement

Hay feeders have no physical restraint mechanism over consumption and relies on the NDF (Neutral Detergent Fibre) of the forage to limit intake.

In practice, if hay is being fed and consumption is more than desired, a lower NDF feed, such as straw may be able to be substituted to achieve lower intake and lower cost while still providing the fibre component of the diet.

Concentrate component of the supplement

There are a number of factors that influence the minimum consumption achieved with the 3-way restriction system. For this application, the most important two factors are:

- Size of the feed ration. The smaller the feed particle size, the more restricted the 3-way restriction system can be set while allowing an unimpeded feed flow. Please note that any trash in a sample can impede its flow.
- Quantity of feed on offer. Without full rumen fill, stock will visit the feeder more regularly and need to achieve rumen will from the contents of the feeder. When stock are offered ad-lib forage with the recommended stock per feeder, they will have adequate rumen fill.

SUGGESTED MINIMUM RATIONS OF DIFFERENT FEEDS

	Cereal grains (clean sample)	4mm pellets	6mm pellets
Mature sheep	250	400	600
Weaned sheep	150	250	350
Mature cattle	2000	3500	5000
Weaned cattle	1000	1750	2500

*Please note this is a guide only

Experiment rations with different feeds and stock

- The Wyeth experiment controlled 4-500kg steers to 1kg/day of barley
- The Laidlaw experiment controlled ewes to 300g/day of oats
- The Veale experiment controlled ewes to 300g/day of wheat

EDUCATING UNTRAINED LIVESTOCK TO GRAIN FEEDERS

Cereal grains are frequently used in this supplementary feeding application. If livestock don't have sufficient training to the feeder and gorge the supplement, this can lead to acidosis and potentially, be fatal.

Acidosis issues can be avoided if untrained livestock are provided a safe feed, like high fibre pellets, in an ad-lib setting to encourage and reward their eating behaviour at the feeder. Once feeding behaviour is consistent, the ration can transition to the cereal grain ration. While this process comes at a cost, time and time again, this has proved to have great results with little cost and minimal rumen upsets. For the full explanation, see page 11 of the Advantage Feeders User Guide.