Defining the northern New South Wales feed-year and mitigating feed-gaps

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Abstract. *Northern New South Wales grazing systems are characterised by a shortage of pasture from May to September. There are a number of different options available to cope with this feed-gap, with their suitability depending on the enterprise. The tablelands region of northern New South Wales is particularly prone to pasture shortages during winter. These can be managed by de-stocking all but essential breeding stock during winter, and timing lambing and calving to occur around or slightly before the spring pasture flush. The spring pasture flush of both quantity and quality feed then coincides to better meet peak nutritional requirements of grazing animals. Any supplementary feeding programs should be carefully assessed to ensure that they are providing the nutrients that the pasture is lacking. Forage crops such as oats should also be considered as a viable option to fill the feed-gap due to its moderate to high nutrient content and comparably high growth rates over the winter months.*

Introduction

Northern New South Wales (NSW) is famous for its super-fine wool, large grazing enterprises and very cold winters (in particular in the Northern Tablelands). Northern NSW consists of the Northern Tablelands and North-West Slopes and Plains. The area has a diverse range of grazing enterprises including fine wool, prime lambs, beef cattle production and cropping in the North-West Slopes and Plains. The pastures consist of both native and improved. Climate including rainfall, evaporation and temperature determine the type of pastures that can be effectively grown and utilised by grazing animals. Picking the right pastures, managing them effectively and filling feed-gaps are all important parts of running a successful grazing enterprise.

The focus of this paper is on the Northern Tablelands as it has the greatest expression (with its very cold winters) of the feed-gap, however, the principles and strategies described are applicable to those other regions of northern NSW.

It is estimated that 50 per cent of pastures on the Northern Tablelands are native (Alford *et al.* 2003) with improved perennial pastures probably making up less than 30 per cent. These native pastures can be further divided into un-fertilised, fertilised and native pastures with some introduced legumes and grasses.

Soil types in the Northern Tablelands have a major influence on the types of pastures that can be grown. The basalt soils are highly fertile and lend themselves to the improved annual and perennial species such as phalaris, cocksfoot, ryegrass, tall fescue and red and white clovers. The granite-based soils are more suitable for the native pastures that have evolved on these soil types such as kangaroo and wallaby grass. Some of the improved temperate grasses such as cocksfoot and white and red clovers will also grow on these granite soils.

Temperature and rainfall are also major determining factors on the type of pastures that can be grown. They also contribute to major feed-gaps in grazing enterprises. By putting together growth-rates and growth patterns of the pasture species in your enterprise, you can effectively plan for feed-gaps and use pasture surpluses more efficiently.

Understanding pasture growth and defining the feed-year

To get a good understanding of your pasture system, it is important to get an idea of what your pasture growth rates are across the year and across pasture species. There are a large number of factors that influence pasture growth. Some of these include species (temperate or tropical, native or introduced), fertiliser history, temperature and rainfall. Monitoring pasture growth-rate on your farm allows you to do pasture budgets to identify feed surpluses and gaps. By identifying feed-gaps in advance it enables you to plan your strategy to get through this period. Strategies may include de-stocking, culling surplus animals (ie. dry animals) or changing the timing of calving or lambing to alter the feed demand profile to better suit feed supply. Pasture budgeting is a management tool that helps producers map the feed-year and manage pasture shortages and surplus.

Estimated growth rates over a 12 month period of both native (Figure 1) and temperate perennial grass and clover pastures (Figure 2) on the Northern Tablelands clearly show a defined 'winter feed-gap'. Northern NSW has a large number of frosts resulting in low ground

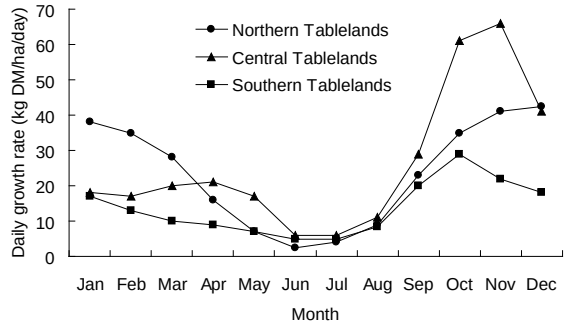

Figure 1. Estimated pasture growth rate of Microlaena/ clover pastures on the NSW Tablelands (Source: Alford *et al.* 2003).

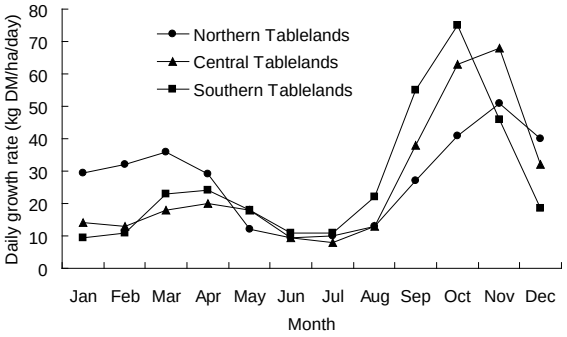

Figure 2. Estimated pasture growth rate of temperate perennial grass and clover pastures on the NSW Tablelands (Source: Alford *et al.* 2003).

temperature which contributes to low growth-rate in winter. Growth-rate can fall below 10 kg DM/ha/day from May to September for the native grasses, and below 20 kg DM/ha/day for the temperate perennial grass and clovers. This winter feed-gap is one of the main challenges for grazing enterprises in northern NSW.

Growth rates of these pastures are at their highest levels from September to December with growth rates above 30 kg DM/ha/day for the Microlaena/clover pastures and 40 kg DM/ha/day for the temperate perennial grass and clover pastures. Growth-rates steadily decline from December through until May due to high evaporation rates in the summer.

Pasture quality also tends to be higher during spring where there are high levels of green leaf in the pasture resulting in high energy, protein, digestibility and low fibre. As there is a bulk of feed grown in the spring much of this feed is carried into summer and autumn, however, as it matures it becomes less digestible and lower in energy and protein. Effectively managing spring growth and utilising this feed while it is at its optimum for animal performance gives the best returns in grazing enterprises.

Ayres *et al.* (2000) looked at temperate perennial pastures (tall fescue, phalaris, perennial ryegrass, cocksfoot, white clover and red clover) for weaner cattle in Glen Innes. Results from the trial led them to characterise the feed-year into three distinct phases. They are as follows:

- Spring primary growth
  High availability of green leaf
  High digestibility (80–85%)
  Very high levels of nitrogen (N) (30 g N/kg DM)
- Summer-autumn secondary regrowth
  High availability of green leaf
  Moderate digestibility (65–70%)
  Moderate levels of N (15–20 g N/kg DM)
- Winter dormancy
  Low availability of green leaf (750–1,500 kgDM/ha)
  High digestibility (75–80%)
  High levels of N (20–30 g N/kg DM)

Dicker *et al.* (2000) looked at weaner growth rates in the Northern Tablelands over a three year period (with no supplementation) and found that growth rate was seasonal, as we would expect. Live-weight gain ranged from less than 0.5 kg/hd/day during winter to 0.8 kg/ head/day during spring, while the summer/autumn gain was 0.3–0.7 kg/head/day.

Management practices for improving animal production

Filling the feed-gap

There are a number of options available for filling the winter feed-gap. The most suitable strategy or strategies will be determined by individual farms and their livestock enterprises. Some of these options include making silage or hay from surplus pasture in the spring, planting forage crops such as oats, wheat, barley or triticale that have active growth over the winter months and buying supplementary feed including hay, silage, grain (pellets) and whole cottonseed.

Shifting feed demand

Another management option other than filling feed-gaps is shifting feed demand to better match pasture growth. Feed demand will vary over the year according to stock numbers and physiological state of the animals. Pregnant and lactating animals have higher requirements for both dry matter (DM) and nutrients. Autumn lambing or calving is not advisable in the Northern Tablelands because the cows/ewes reach their peak nutrient requirements when feed supply is at its lowest. To meet animal requirements, a high level of supplementary feeding will be necessary. The vast majority of enterprises in northern NSW lamb in the late winter and spring and calve mid- to late-winter.

Forage crops

Planting forage crops to provide a good quality body of feed in the winter is a good way of filling the winter feed-gap. Forage oats has been a popular choice in the past, but more grazing enterprises are looking towards alternative species such as barley, triticale and winter wheats.

'Prograze' (Anon 2006) estimates the growth rates for forage oats in an average Northern Tablelands season to be 27 kg DM/ha/day in April, falling to 19, 18 and 19 kg DM/ha/day in May, June and July, respectively, increasing to 29 kg DM/ha/day in August and 47 kg DM/ha/day in September. These growth rates are higher than the temperate pastures and native pastures shown in Figures 1 and 2, making it a viable alternative to fill the winter feed-gap. It is worthwhile to look at figures from the North West-Slopes and Plains to compare figures between pastures and forage crops to help fill feed- gaps.

Forage crops can be locked up to make good quality cereals and hays that can be fed during the next winter or feed gap. Dual purpose forage crops can be grazed initially and then locked up and harvested for grain. The grain is particularly useful for feeding pre-lambing ewes or weaners. Another option once the grain has been harvested is to bale the crop stubble. The stubble can provide an effective fibre source whilst grazing lush pasture, clovers and cereal crops. Crop scours can be a major loss of production in grazing systems.

Hay and Silage

Hay and silage are essential tools in a grazing enterprise. In situations when there are low levels of DM in the paddock, a roughage source is needed to ensure optimal rumen function. Hay and silage can be used for maintenance or growth, depending on the quality, or can make up the roughage component of a grain-based ration.

Making hay and silage can be used as a pasture management tool to utilise feed surpluses. By taking a paddock out of production or by shutting up an area not needed for grazing, good quality hay or silage can be made and utilised at a later date. The remaining pasture will be of better quality due to higher grazing pressure and less time for the pasture to decline in quality.

Pasture supplementation

It is rare in a grazing enterprise that pasture will contain all nutrients that the animals require. By identifying the nutrient requirements of the livestock classes throughout the year and then comparing it with what is available from the pasture enables you to determine what nutrients are lacking for optimum production. Too many feeding programs are used because of 'tradition' or what the neighbour uses rather than looking at what is lacking and then determining how best to satisfy the requirements.

Conclusions

To get the most out of grazing systems in Northern NSW, it is essential to get a good handle on the growth rates of the pastures in your system throughout the year. This can then be matched to animal demand and feed-gaps can be identified. Filling the feed-gap can include supplementation depending on what is deficient (ie. DM, protein or energy) or shifting feed demand by de-stocking or changing your lambing and calving patterns.

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