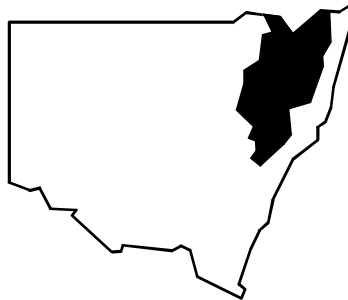




NSW Agriculture

# Matching pasture production to livestock enterprises Northern Tablelands, North West Slopes and Upper Hunter

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This publication contains both estimates of the daily growth rate of pastures and selected forage crops, as well as a guide to selecting pasture and forage crop types for enterprises requiring high livestock growth rates.

Estimates are of the median growth rate, and are based on available research results, growth predictions from the 'Growest' model, (a simple growth model using soil moisture, temperature and light) and from long term observations by experienced agronomists and livestock officers. This approach has been adopted as it is inappropriate to base growth rates solely on research data given the climatic variability and the relatively short period over which research results are collected.

Growing conditions vary greatly between seasons, between regions, districts and indeed between parts of paddocks. The estimates presented are therefore **approximations only and intended only as a guide** to assist producers in budgeting feed supply to meet livestock requirements.

It is anticipated that as further information comes to hand that these guidelines will be updated. Feedback is most welcome.

In the future, improved models such as 'GrassGro' (currently being developed by CSIRO) will provide more accurate estimates.

Producers are advised when using these estimates that large variability in the reliability of feed supply occurs and reference to the section covering variability is strongly advised. Presented growth curves are 'smoothed' with variability reduced to facilitate use.

## ASSUMPTIONS

Pastures are of satisfactory density for the area, growing on a soil of good moisture holding capacity (e.g. clay loam), grazed at moderate stocking pressure, well managed and fertilised adequately (except where specified) to avoid nutrient deficiencies. Pasture is assumed to be maintained in the vegetative phase of growth where possible.

Climatic data used in the 'Growest' model was from CSIRO Pastoral Laboratories at 'Chiswick', Armidale (1959-93), and Tamworth (1973-80).

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## **ESTIMATES OF DAILY GROWTH RATE OF PASTURES**

### **NORTHERN TABLELANDS**

*Description of pasture types used in estimates*

#### **Fescue/white and sub clover**

High content of fescue, with at least 20% legume with white clover significant during the warmer months. Minor amount of annual weeds only. Soils of at least moderate fertility with nutrient requirements maintained.

#### **Phalaris/white and sub clover**

High content of phalaris, with at least 20% legume with white clover significant during the warmer months. Minor amount of annual weeds only. Soils of moderate to high fertility with nutrient requirements maintained.

#### **Red grass dominant pasture**

Main perennial grass is red grass but other frost susceptible summer growing native grasses also present. Little clover present with low to moderate presence of annual weeds. Soils of moderate natural fertility. No fertiliser applied for many years, if at all.

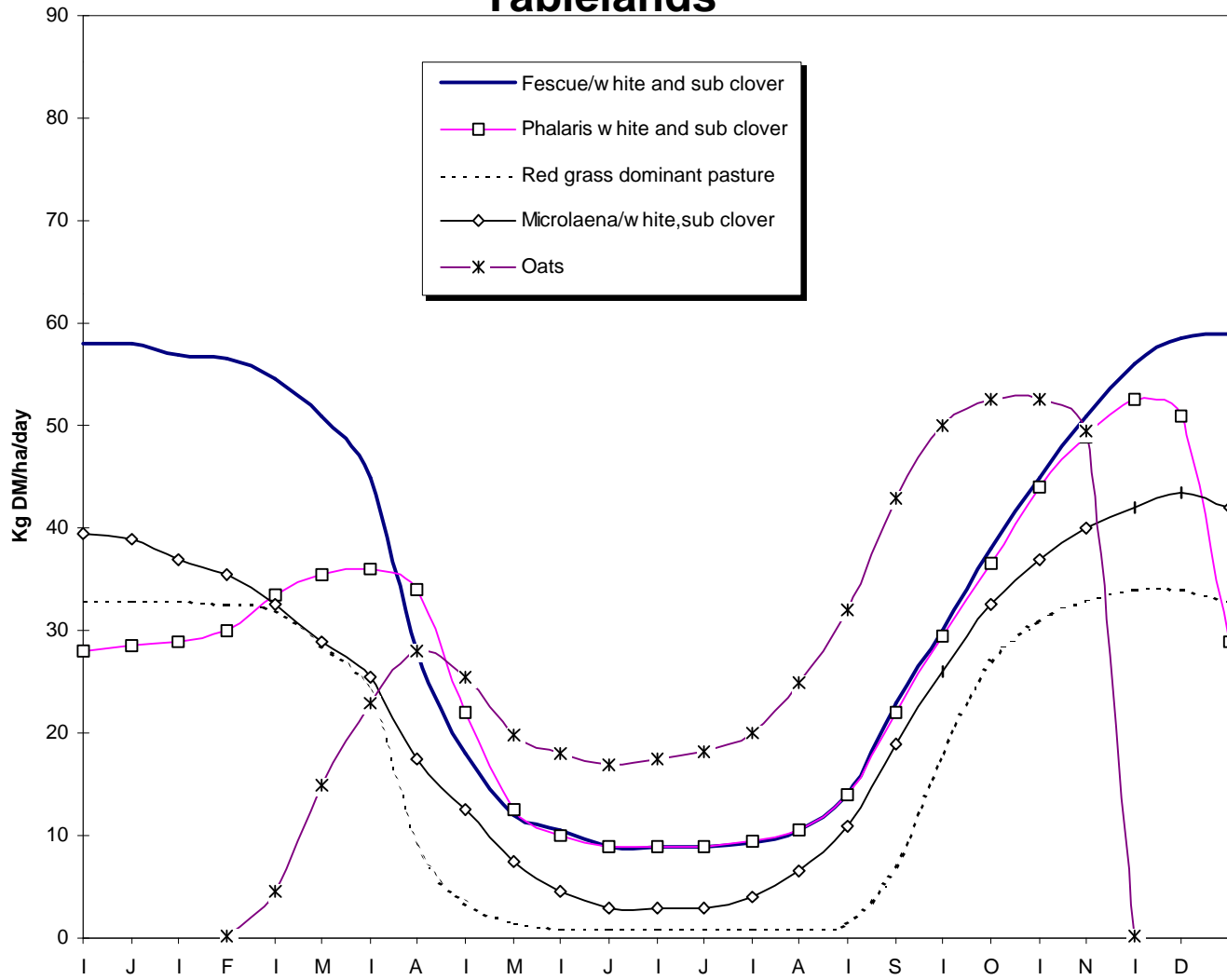
#### **Microlaena/white sub clover**

Microlaena is the dominant perennial grass with legume present to at least 20% of the pasture. Soils of moderate to high fertility, with nutrient requirements maintained.

#### **Oats**

Early sown (early February), on moderate to good fertility soil, sown with adequate fertiliser, applied at sowing.

## Estimated growth rate of pastures - Northern Tablelands



## **NORTH WEST SLOPES AND UPPER HUNTER**

*Description of pasture types used in estimates*

### **Phalaris sub clover**

Good balance of phalaris and sub clover with sub clover being at least 20% in the growing season. Low percentage of annual weeds present. Soils moderate to good fertility. Soil nutrients applied to maintenance level only.

### **Summer grass dominant**

Red grass or frost sensitive summer growing grass dominant in pasture with little or no clover. Small quantity of annual weeds present. No fertiliser applied for many years, if at all.

### **Danthonia, sub clover**

Main perennial grass is Wallaby grass (Danthonia) with at least 20% sub clover present in the growing season. Small quantity of annual weeds present. Soils moderate fertility. Fertiliser applied to maintenance levels only.

## **Lucerne**

85% or better lucerne content with minor amounts of annual weeds. Soils well drained, moderate to good fertility, with maintenance fertiliser applied only. Variety is winter active (e.g Aurora)

### **Sub clover dominant**

75% sub clover dominant with lesser amounts of annual weeds present. Soils moderate to good fertility with fertiliser applied to maintenance levels only.

### **Medic dominant**

75% barrel or naturalised burr medic with smaller amounts of annual weeds present. Soils moderate to good fertility. Fertiliser applied to satisfy maintenance requirements.

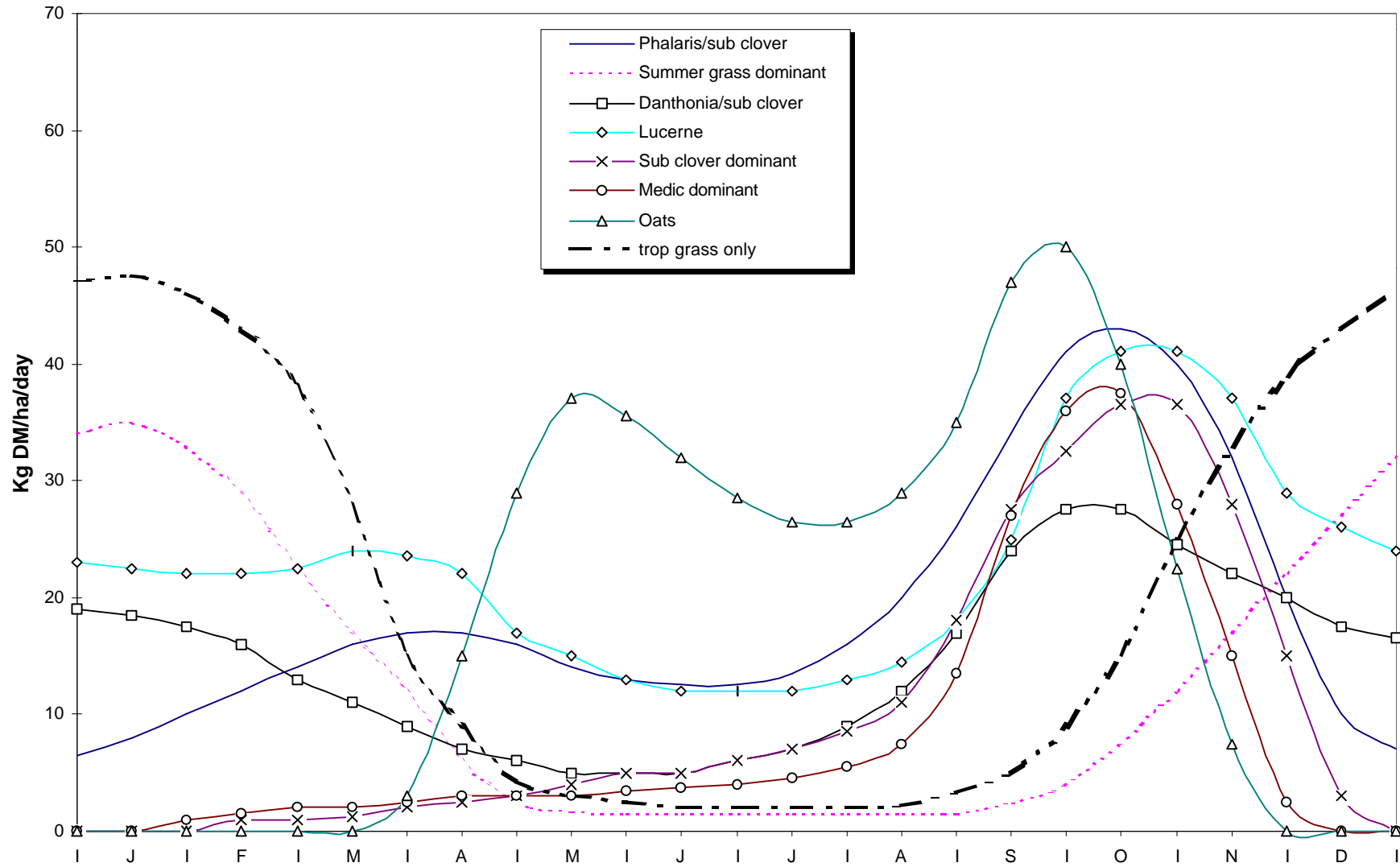
### **Oats**

Late February sown on good moisture with adequate fertiliser. Sown on moderate to good fertility soils.

### **Tropical grass only**

Tropical grass only pasture consists of a mix of bambatsi panic and purple pigeon grass with less than 5% content of sub clover or medic. Moderate fertility with fertiliser at maintenance levels.

## Estimated growth rate of pastures - North West Slopes and Upper Hunter.



## GUIDE TO PASTURES AND FORAGE CROPS FOR HIGH LIVEWEIGHT GAIN IN SHEEP AND CATTLE

### Feed Plans

Estimates made on the likely availability of feed of adequate quality have been made on this basis of,

- a) Pastures are grown in suitable soils etc. and are well adapted to that environment.
- b) Pastures are well managed for both the good of the pasture and the livestock enterprise. This may involve spelling pastures for 6–8 weeks to accumulate adequate quantity of feed to supply enterprise requirements. Pastures are also maintained in the vegetative growth phase so that quality is at a high level. (This is especially relevant with summer growing grass species).
- c) Quality feed in the context of these plans means feed on offer having a digestibility of 70% or better, and means a ‘mixed’ pasture has a good balance of legume present.


d) Plans do not infer that this is only one paddock of a particular pasture type i.e. one may be grazed while others are rested to enable availability to be improved to meet livestock requirements.

e) The estimates are intended as a **guide only** to assist in selection of appropriate pasture types to suit the enterprise targets. The variability in production is large and is covered in the variability section.


f) The quantity of feed available will be dependant on the growth rate of the pasture, fertility, stocking rate, rate of wastage, and previous management of the pasture. These estimates only indicate that in any particular half month period the pasture type is capable of having feed on offer of adequate quantity and quality to suit requirements in average seasonal conditions. Additionally, potential production may be greater than that indicated, given exceptional management and/or favourable aspects of pasture production. Similarly, production can be less than that indicated, especially if management is less than accepted ‘best practice’.


# A guide to pastures and forage crops capable of achieving at least 75% of maximum liveweight gain given best practice management of pastures and livestock

## Key

 High quality sheep and cattle feed capable of achieving at least 75% of potential liveweight gain

## NORTHERN TABLELANDS

 High quality sheep feed capable of achieving 75% of potential liveweight gain

 Feed inadequate in quality and/or quantity to reliably provide for high growth rates in either sheep or cattle

Pasture	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Native summer grasses												
Micolaena/white clover												
Native/white clover												
Cocksfoot/fescue/white clover												
Phalaris/white clover												
Phalaris/sub clover												
Lucerne												
Chicory												
<b>Forage crops</b>												
Japanese/shirohie millet												
Oats												
Brassicas (autumn sown)												
Brassicas (spring sown)												
Short term ryegrass/red clover												
Short term ryegrass												

These estimates are provided by agronomists and livestock officers as an aid to pasture selection and represent the likely production from these feed sources in average years, given the feeds are grown in appropriate soils and are well managed. Adjustments will need to be made in most situations to cover the many variables involved in pasture production. Months are represented by two half months.

\* See Prograze manual for benchmarks on feed availability requirements for various levels of liveweight gain.

# A guide to pastures and forage crops capable of achieving at least 75% of maximum liveweight gain given best practice management of pastures and livestock

**NORTH WEST SLOPES and**

**UPPER HUNTER**

**Key**



High quality sheep and cattle feed capable of achieving at least 75% of potential liveweight gain



High quality sheep feed capable of achieving 75% of potential liveweight gain



Feed inadequate in quality and/or quantity to reliably provide for high growth rates in either sheep or cattle

Pasture	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Native summer grasses												
Native/sub clover												
Phalaris/sub clover												
Lucerne												
Chicory												
Lucerne/sub clover												
Annual ryegrass/sub clover												
Danthonia/sub clover												
Lovegrass/serradella/sub clover												
<b>Forage crops</b>												
Hybrid pearl millet												
Japanese/shirohie millet												
Oats												
Short term ryegrass												
Forage sorghums												
Lablab												
Cowpeas												

These estimates are provided by agronomists and livestock officers as an aid to pasture selection and represent the likely production from these feed sources in average years, given the feeds are grown in appropriate soils and are well managed. Adjustments will need to be made in most situations to cover the many variables involved in pasture production. Months are represented by two half months. \* See Prograze manual for benchmarks on feed availability requirements for various levels of liveweight gain.



## VARIABILITY IN FEED PRODUCTION

### Important Factors Affecting Reliability of Feed Production

The variability in pasture production in tableland and slopes districts can be very large and for this reason, it is wise to consider all important variables that may affect pasture production in a paddock.

The more important factors to consider are:

- Climate
- Soil type
- Grazing management
- Soil fertility/fertiliser use

#### Climate

This is the largest variable across the tablelands and slopes of NSW

To get an idea of the extent that climate can affect pasture production, the growth model used to assist in producing the pasture curves elsewhere in this publication can also give an indication of how much variation occurred in the past based on historical climatic data.

On the **Northern Tablelands**, assuming that species capable of growing in all months make up the pasture and that they are capable of producing at 100 kg/ha/day, the model predicts that in good growing conditions in autumn, growth rates can be about 80% or more above the median or middle value and in poor growing conditions 60% or more below. In other seasons the differences were not as great being about 30% and 40% respectively.

Similarly, on the **North West Slopes**, the model predicts that in good growing conditions in summer and autumn, growth rates can be over 100% above the median values. In the other seasons the differences were not as great, being about 40% higher. In poor growing conditions across all growing seasons, the growth rate predictions are about 50% or more below the median values.

Variability can exceed these predictions in droughts and years of excessive rainfall.

#### Geographic location

The growing conditions within these geographic areas can be very significant. Generally growing conditions are more favourable in the east than they are to the west which is drier with less reliable rainfall.

North to South differences can also be significant with summer dominance in rainfall increasing to the north.

#### Soil type

The daily growth curves presented assume a soil type that has good moisture holding capacity (eg. clay loam).

On lighter textured soils (eg. granites) the pasture production will be much less as soil dries out more rapidly reducing pasture production potential. On the positive side, lighter soils tend to respond quicker following rain than do heavier soils.

#### Grazing management

Pasture production estimates assume that pastures are in the vegetative stage of growth, and stocked at moderate grazing pressure and well managed. Overstocking and inappropriate grazing management for the species concerned may greatly affect the ability of the pasture to reach its full potential. Alternatively, correct management can greatly enhance the probability of the pasture reaching its full potential.

Pastures that have been grazed hard in the months beforehand may have inadequate leaf area to produce to maximum potential. Similarly, lax grazing will result in low potential for growth rate

#### Soil fertility/fertiliser use

Soil deficiencies especially phosphorus, sulfur and molybdenum, can greatly affect the potential of pasture to produce. Similarly, low pH may have an adverse affect depending on the species in the mixture. Nutrient deficiencies can affect not only the overall production but also the reliability of production, seasonal production, botanical composition and quality of feed produced.

#### Pasture quality

Pasture quality is also very variable along with production quantity.

In the growth curves presented, quality will not be uniform throughout the year from any one species. For example, in the spring growth will tend to be lower quality than in the autumn because of the greater proportion of stem than leaf produced. This factor is extremely important with summer growing species when they are in the reproduction phase.

## Other factors

A large range of other factors may influence the potential of the pasture to reach its full potential. In some instances, these minor factors can cause devastating reduction in the reliability of feed supply.

Factors include pasture species adaptability, weeds, pests, diseases, aspect, waterlogging, salinity etc.

If in doubt about the extent of the potential reduction in pasture production due to any of the above mentioned factors consult your district agronomist.

## CONTRIBUTORS

The following agronomists and livestock specialists have contributed information presented for the respective areas.

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## DISCLAIMER

The information contained in this publication is based on knowledge and understanding at the time of writing (November 1999). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up-to-date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.

## NOTE

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

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