

Maximising Pasture Harvest

January 2010

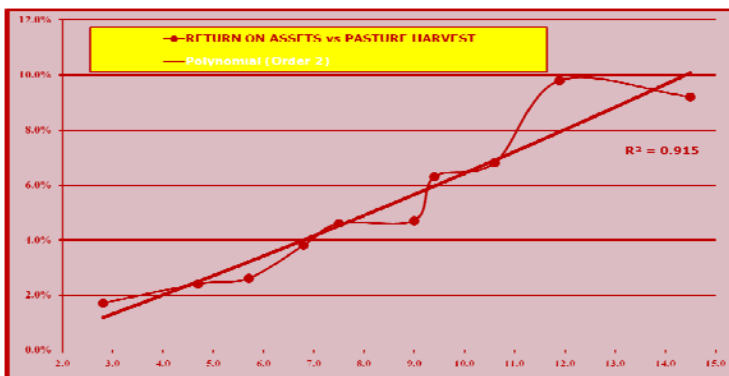
A Farm Advice Sheet from **SowtheSeed**

Pasture is the primary driver of farm profitability. Our aims in pastoral farm management are to achieve:

- Productive pastures
- Persistent pastures
- High quality pastures
- High utilisation of pasture by grazing stock

Research has now proven that all 4 goals can be achieved through understanding how pastures grow, what they require to perform at their best, and how management, particularly **grazing management**, can provide this. Optimising plant growth using leaf phase management will determine the best time to graze, the intensity and the duration of grazing. Using leaf phase pasture management will maximise pasture harvest.

Pasture harvest is a key driver to farm profitability. The correlation is so strong that if pasture harvest is improved, then Return on Assets (ROA) will improve also. See Graph 1. Whereas increasing or improving other areas of a farm’s performance may not have a direct correlation to increased profitability. For this reason, all pasture based farming systems must continually focus on improving pasture harvest to achieve sustainable farm profits.



Graph 1: Return on Assets vs Pasture Harvest Source: Red Sky Agricultural

What is Pasture Harvest?

In a pasture based grazing system, we would find it near impossible to accurately measure pasture growth. But in the same system, we can get a very good estimate, with a strong degree of confidence, of pasture harvest.

Pasture harvest is calculated as follows:



Effectively pasture harvest is the amount of pasture actually eaten, including nitrogen boosted growth, to achieve the farm’s performance.

The reason to improve Pasture Harvest

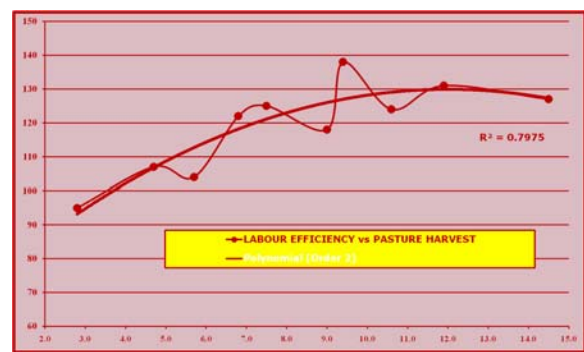
By optimising pasture harvest through leaf phase management we will increase pasture supply, which then provides opportunities on farm for increased pasture harvest and profitability.

Increased pasture harvest has the following impacts:

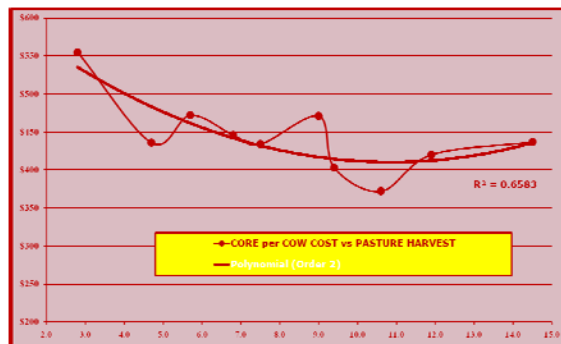
- Increased profit
- Other profit indicators improve in efficiency
 - Cost of Production decreases, through decreasing Cost of Pasture
 - Labour Efficiency increases
 - Core Costs per Cow decreases
 - More efficient use of resources – the land
 - Probable lift in milk production



Graph 2: COP per kg MS vs Pasture Harvest Source: Red Sky Agricultural



Graph 3: Labour Efficiency vs Pasture Harvest Source: Red Sky Agricultural



Graph 4: Core per cow cost vs Pasture Harvest Source: Red Sky Agricultural

How to Improve Pasture Harvest

There are many factors that affect pasture harvest:

- Pasture Management skills
 - When to graze
 - Grazing intensity
 - Grazing duration
- Climate/Environmental Conditions
- Stocking Rate
- Mean calving and drying off date

- **Pasture Management Skills**

- **When to graze**

The **best** choice of when to graze pasture to optimise pasture performance must coincide with the emergence of 2-3 leaves/tillers, or earlier if canopy closure occurs. Grazing should be based on leaf regrowth / emergence stage. This reflects the plant's energy status and affects regrowth, survival and quality.

Research by Bill Fulkersonⁱ and Danny Donaghyⁱⁱ has consistently shown that if ryegrass pastures are allowed to reach the 3 leaf stage, the proportion of pasture grown to each fully developed leaf (as high quality pasture, >11.5ME) is as follows:

1 st Leaf	12-20%
2 nd Leaf	30-35%
3 rd Leaf	45-50%

Research has also shown that pasture grazed between the 2 and 3 leaf stage is much higher quality when compared to younger (<2 leaf stage) or older (>3 leaf stage) pasture. Pasture grazed in this 2-3 leaf stage is nutritionally better for the cow: protein to sugar ratio is closer to optimal for rumen function and mineral composition is closer to cow requirements.

For further information regarding nutritional characteristics of ryegrass at different leaf stage development refer to August 2009 SowtheSeed, *Leaf Phase Management*, page 5.

Using leaf stage in determining when to graze pasture helps to develop an understanding of factors affecting leaf emergence, and gives a better indication of potential feed shortages or surpluses. It is easier to assess that pasture is at a 1, 2 or 3 leaf stage, than to assess it as either 2600KgDM/ha or 2800KgDM/ha.

- **Grazing intensity**

Having assessed the best time to graze, we must ensure that pasture is grazed at the optimum intensity or residual. This aspect of grazing management has been well documented and discussed over the years and is still debated, but the research is clear: *the ideal post-grazing residual for ryegrass pasture is an average of 4-5cm of stubble in grazed areas.*

It is critical to set this residual early in the season, as once residuals build-up (>6cm in grazed areas), stem formation and dead material increases. This is difficult for cows to easily graze down without adversely affecting milk production. Pasture production also declines as shading occurs. If grazed down, pasture production is reduced when previously shaded tillers have to adjust to the reduced pasture height.

Continued lax grazing (>6cm) makes the plant less reliant on stored energy, and while in the early part of the next rotation re-growth is faster, it is only faster in this next rotation, not the second or third. In fact, leaf death occurs sooner when greater residuals are left after grazing. On fast rotations (<2 leaves), the un-grazed leaf may not be dead but they will not be grazed by the cow, and are left to rot away, wasted because they are of lower nutritional value. These older un-grazed leaves are less photosynthetic than younger leaves. As a result, less water soluble sugars are produced by the leaves. Lax grazing decreases tiller survival as the tiller starts growing from above the soil surface from a raised growing point. These tillers are known as

aerial tillers. Their survival is reduced due to their roots being exposed to sunlight, and from future grazing. Reducing tiller density reduces future dry matter production. Lax grazing also increases the shading of clovers, and allows more stem elongation of ryegrass, increasing the fibre content of the pasture, and reducing digestibility.

Continued hard grazing (<4cm), reduces water soluble sugars reserves as more of the storage organ is removed. This results in slower re-growth and lower dry matter yields. Over grazing results in pastures thinning out, becoming weedy, or less desirable grasses fill the gaps and more of the soil surface is exposed. In some areas (Taupo north) soil surface temperature gets too hot and plants die, particularly clovers.

- **Grazing duration**

This is simple: no longer than 2-3 days as new leaf growth will be subject to being grazed. These new leaves have grown from stored water soluble sugar reserves; grazing them severely reduces future re-growth and may kill tillers. If cows are grazing a large paddock which will take more than 3 days to complete, then a back fence should be used.

In both grazing intensity and duration, pasture allocation is important. This is where good pasture assessment comes into play. How much feed (KgDM/ha) is in the paddock? Leaf stage assessment does not replace the measurement of dry matter; they work together to maximise feed supply, and the quality and nutritional value of pasture being fed to stock.

- **Climate / Environmental Impacts**

Once pasture management using leaf phase emergence is adopted, the farmer is more aware of the factors which impact growth, persistence, quality and nutritional value. With this understanding the farmer is in a stronger position to predict, plan and overcome adverse conditions. Environmental conditions have less impact on the farms performance, and the farmer is less likely to over react.

- **Stocking Rate, Mean Calving and Drying Off dates**

Once grazing optimises pasture supply, quality and nutritional value of the pasture and is moving toward maximising pasture harvest, then the farming business is in the correct position to make changes (if any) to stocking rate, mean calving and drying off dates. Only once effective pasture management is in place and adhered to, should major changes be made to these areas of farm policy.

Where to from here?

Leaf phase pasture management, together with excellent dry matter assessment, opens up opportunities in future management options. These may include increased stock numbers, earlier calving, later drying off and more, or less, supplementary feed. These decisions are strategic management issues, and changes in such areas of major farm policy based on sound pasture management skills will have major impacts on the sustainable profit and longevity of a farming business.

Changing or evolving your current pasture management can be challenging. Intelact Consultants are skilled, profit based consultants who can help you maximise your pasture harvest, increase your farming business profit and enable you to make better decisions on farm. Contact your local Intelact Consultant or call Intelact Head Office 0800 735 588.

¹ <http://www.vetsci.usyd.edu.au/about/staff/bfulkerson.shtml>

² <http://fcms.its.utas.edu.au/scieng/agsci/pagendetails.asp?ipersonid=120>