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Department of Agriculture and Food

GOVERNMENT OF WESTERN AUSTRALIA

FEED TROUGH

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Western DAIRY

Designer Forages

by David Nation, Dairy Futures CRC

One of the major programs of the new Dairy Futures Cooperative Research Centre (CRC), a large-scale partnership between dairy farmers, pasture and cattle breeding companies, government and researchers, is Designer Forages.

Designer Forages major impacts are to:

1. Develop new methods of creating high-yielding and high-energy ryegrass cultivars;
2. Improve the digestibility of tall fescue and warm-season grasses;
3. Create a new opportunity to use white clover in perennial pastures;
4. Identify elite and animal-safe varieties of endophytes, and build new methods for ensuring that the correct endophyte is present in pasture seed.

Additional research goals for the program are:

1. Expand the range of traits that can be used for selection of improved grasses and legumes; particularly traits that improve the persistence of pasture and its ability to thrive in warmer and drier climates;
2. Invent a DNA-based approach for the identification of cultivars to confirm plant variety rights and improve the commercial seed production process.

The research program is conducted by the Department of Primary Industries Victoria with laboratory facilities in Melbourne.

The project team work with both PGG Wrightson Seeds and Heritage Seeds to test the innovations under field conditions and develop the new technologies in the latest cultivars.

The most advanced grass technology is the high-yielding and high-energy ryegrass. Prospective new lines of ryegrass have undergone initial field testing and the best lines have been planted out this spring for further trials.

White clover research is advanced, with resistance to alfalfa mosaic virus demonstrated in the field and additional traits under investigation include increased seed yield and biomass yield, tolerance to aluminium soils and improved uptake of phosphorus.

A range of novel approaches are being studied with endophytes for both ryegrass and fescue. This includes DNA-fingerprinting technology that will provide quality assurance in the selection of endophytes and for commercial seed production. The aim is also to discover new endophyte genetics that is animal-safe and confers significant new benefits to pasture in yield and persistence.

The Dairy Futures CRC is also providing a major investment in animal breeding, with the main objective to improve the reliability of Australian Breeding Values using DNA-based technology (called genomics). Genomics will allow new traits, such as feed conversion efficiency (FCE), to be measured. A group of high and low FCE cows now in milk at Ellinbank, Victoria, will be studied for the next three years and will provide the basis for developing a new genomic trait. ■

For more information: the website is planned to be operating by December: www.dairyfuturescrc.com.au

Above: ryegrass plant growing in tissue culture.

From the Editor's Desk

The dry season that is engulfing WA will be the focus of three workshops (Nov 1, 3 and 4) held in Harvey, Busselton and Kronkup (near Albany) respectively.

Northern Victorian dairy consultant Cam Smith, Victorian dairy farmer Peter Sexton and psychologist Dennis Hoiberg will spearhead the seminars to explore a series of practical strategies to manage with less feed and water.

The seminars will be rung from 10am to approximately 3pm, include a light lunch and come with compliments of Western Dairy.

RSVP's for catering purposes are essential:

e: esther@estherprice.com.au, **p:** 08 9525 9222.

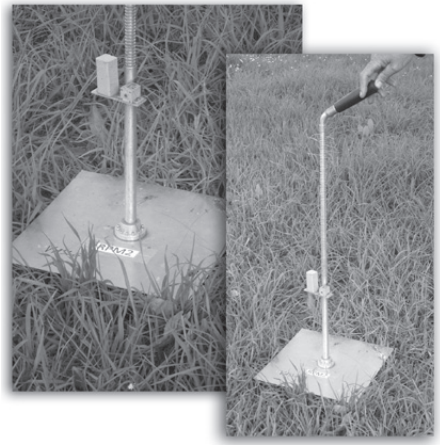
Water logging p3

Calculating pasture mass

by Martin Staines, DAFWA, with thanks to Andrew van Burgel (DAFWA, Albany) for statistical analysis of the data.

The rising plate meter (RPM, see photo below) is a simple tool for estimating pasture quantity. Used properly, it provides a good estimate of pasture height, which is essential information if the goal is to optimize grazing management. The key to using the RPM is to take lots of measurements all over the paddock to allow for pasture height variation.

The RPM can also be used to work out 'pasture biomass' if you have reliable information on how to convert pasture height into pasture biomass. Pasture biomass is jargon for the amount of pasture in a paddock, normally expressed in kg or tonnes of pasture dry matter per ha (dry matter is determined by oven-drying the pasture to evaporate all water, which usually makes up 80-90% of the pasture weight).



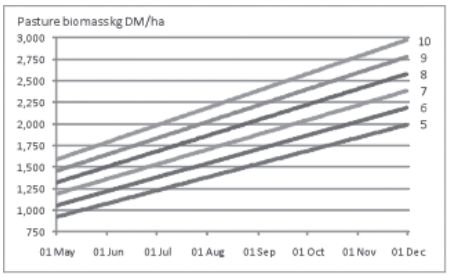
***Above:** The type of rising plate meter used in our studies*

The DAFWA dairy team has used the RPM intensively over the past 12 years as part of the dairy pasture research at Vasse Reseach Centre near Busselton, WA. In order to convert pasture height into pasture biomass, DAFWA staff took thousands of samples and measurements to 'calibrate' the RPM for both annual ryegrass and irrigated (centre-pivot) perennial ryegrass pastures.

The large data set has now been analysed statistically to derive the best possible equations to calculate pasture biomass from pasture height at any time of the year. The results are summarised here.

Annual pasture (May to November)

Calibrations were taken weekly between May and November 2000 to 2007. The equation below converts annual pasture height to biomass for paddocks that are grazed regularly (but excludes paddocks with pasture regrowth after silage/hay cutting). The change in biomass of annual pasture during the growing season at 5-10 cm pasture height is shown in Figure 1. The equation reflects pasture biomass at 10cm increasing by 200kg/ha per month, which is a result of increasing density of the sward.



***Left: Figure 1 -** The change in biomass of annual pasture during the growing season at 5-10 cm pasture height*

- Biomass (kg DM/ha) = 259 + 3.5*D + (133 + 0.3*D) * Height (cm), where D is the number of days since May 1st.

Annual pasture regrowth after silage harvest

Calibration data for pasture re-growing after silage harvest were collected between late Oct and late Nov (2001 to 2004). Biomass after silage/hay harvest was about 500kg DM/ha less than estimated for grazed pastures.

Irrigated Pasture (all months)

Calibration data for irrigated (centre pivot) pasture were collected between Oct'05-Feb'06 and Nov'06-Dec'07). Irrigated pasture growth varied considerably throughout the year and required four different equations to convert irrigated pasture height to biomass:

- **December to March:** Biomass (kg/ha) = 600 + 280 * Height (cm).
- **April to June:** Biomass (kg/ha) = 600 + (280-D) * Height (cm), where D is the number of days since March 31st.
- **July and August:** Biomass (kg/ha) = 600 + 188 * Height (cm).
- **September to November:** Biomass (kg/ha) = 600 + (188+D) * Height (cm), where D is the number of days since August 31st. ■

For further information, contact:
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Keeping Cows Cool

by Steve Little, Dairy Australia

Now is the time for dairy farmers across Australia to sit down with their farm team and plan exactly how they will deal with heat stress in their herd this 2010-11 hot season.

Things that should be discussed include:

- Who will monitor weather conditions week to week?
- How hot should it be before the sprinklers are turned on before afternoon milking?
- Whose responsibility is it to keep an extra close eye on water troughs and ensure the sprinkler system is working effectively?
- At what point will the sprinklers also be used to cool cows before am/pm milking?
- Can we avoid milking in the hottest part of the day? (about 3pm). How can we make this work with our milking roster?
- What paddock rotations and feeding strategies will be used to help keep cows eating in weeks when heat stress risk changes from moderate to high to severe?
- What actions do we take if we observe cow breathing rates exceeding 60 breaths per minute, indicating that cows' heat load is increasing?

To help WA dairy farmers keep an eye on weather conditions, anticipate their likely effect on cows' heat load week to week, and adjust their cooling strategies to suit, the Cool Cows website's Weather Forecaster tool now provides heat load information for two locations - Bunbury and Busselton.

In addition to a table of the maximum daily Temperature Humidity Index (THI) forecast for the next 6 days, the Cool Cows Weather Forecaster tool also provides a graph showing THI movements through each day and night. This is useful because if the night remains warm after a warm / hot day, this will limit the amount of heat cows can off-load, and additional cooling strategies may be needed to prevent heat load from accumulating day to day. (This is of greatest concern in high-production herds).

WA dairy farmers can also now subscribe to the free Cool Cows Heat Stress Alert e-mail service which automatically warns them when their cows are at risk of heat stress, prompting them to take action in the week ahead to reduce the effects of heat stress. These effects include a drop in milk production, reduced herd fertility and lower milk protein and fat tests. Heat stress can also trigger live weight losses and animal health problems.

The weather forecasting tool and email alert service are just two examples of the information and interactive resources available on the Cool Cows website.

Cool Cows resources have been developed with funding from Dairy Australia and the Australian Government Department of Agriculture, Fisheries and Forestry. ■

More information: www.coolcows.com.au
or www.dairyaustralia.com.au

WATER LOGGING and pasture growth

by Martin Staines, DAFWA

Water logging is a common sight in paddocks in the south-west of WA during winter. While the problem is minimal or even non-existent in some years (2010 or 2006 for example), in other years severe water logging can persist for 3 months or more (remember 2007 and 2009).

This begs the question: "is pasture growth rate affected by water logging"? Common sense would suggest it must be, but by how much? The DAFWA Dairy Team undertook a trial, starting April and finishing November, over the winter of 2009 to find out.

We started with well-established perennial ryegrass growing in 200 pots (15 cm diameter and 40 cm high) filled with sandy soil. Half the pots were kept well-drained but moist at all times, thus providing ideal growing conditions. The other half of the pots was exposed to a realistic level of water logging, by re-creating the same level of fluctuating water-logging we had measured in paddocks at Vasse Research Centre during the wet winter of 2007. Pots were water logged between late June and early Oct (see Figure 1).

Pasture was cut to 5 cm residual at the start of the trial and harvested again in mid June (H1), mid August (H2), early October (H3) and late November (H4) in order to estimate pasture growth rates.

Taken over an entire pasture season the effect of water logging was surprisingly small. Pasture harvest between early April and late Nov was 12.2 t DM/ha for the drained treatment and 11.9 t DM/ha for the water logged treatment, and this difference was not significant. Only at harvest H3 did water logging have a significant negative effect on pasture growth rate (45 vs 36 kg DM/ha/d; see Figure 2). But pasture growth recovered very quickly once water logging stopped (harvest H4).

Remember, though, that our trial measured the effect of water logging alone. In real life water logged pasture is prone to pugging as well, which itself can reduce pasture production and persistency. A priority for water logged paddocks should be to minimize pugging damage. ■

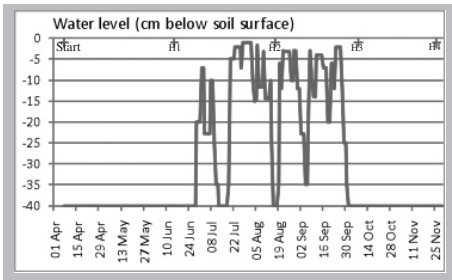

Figure 1: Water level in water-logged pots. Pasture was cut at 'start' and subsequent pasture yields were measured at harvest times H1, H2, H3 and H4.

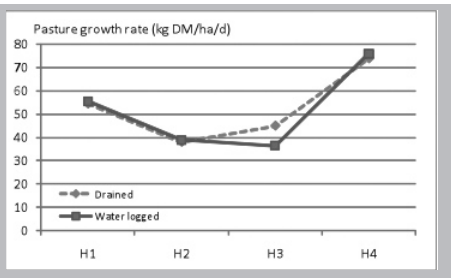

Figure 2: Pasture growth rates for well-drained and water logged perennial ryegrass. Pasture yields were measured at harvest times H1, H2, H3 and H4.

Buying Grain

by Steve Little, Grains2Milk program leader for Dairy Australia

Substantial increases in Australian grain prices over July-August, triggered by uncertainty about northern hemisphere grain stocks and prospects for the 2010 southern hemisphere crop, were cause for concern among dairy farmers buying grain on the "spot" market.

However, the Australian grain market has traded sideways to slightly lower through September and into October, helped by an improved global grain supply situation and a strengthening Australian dollar. While this is good news, as we well know, grain prices are always volatile, and it is difficult to look far ahead.

The Australian east coast grain crop is looking very good at this stage. However, WA's crop is headed for the lowest in ten years due to very dry conditions in the central wheat belt, and with export markets still looking to buy WA grain, WA grain prices are holding up a little above prices in the eastern states.

When buying grain in a volatile market, there are a number of important things to do:

1. Firstly, don't panic. Try not to over-read or over-react to every individual price movement you see reported. Use Dairy Australia's weekly Grain and Hay Report to monitor trends.
2. If you have a forward contract, check that it is watertight. Don't rely on verbal contracts. Confirm your arrangements in writing, including delivery, quality and payment terms.
3. Don't leave grain quality to chance.
   - Note the grades of grain being offered by sellers, for example, ASW, GP or Feed grade wheat.
   - Specify the quality of grain (or any other feed) you buy in writing and don't accept a delivery if it does not meet those standards.

As recommended in the Grain and Hay Report, with the impending harvest, dairy farmers should ready themselves with a plan on how to approach grain buying at harvest. Buying ex-paddock can save costs, and grain downgraded from milling grades can present attractive options. However, always be sure you know what you are buying. Be particularly careful if sourcing whole grain off farm from drought-affected areas as it may well have higher proportions of small, pinched grains and higher levels of screenings. This is particularly important if you are crushing your own grain on farm, as your equipment may not be able to process the grain effectively, resulting in grains passing through the cow undigested and being wasted. ■

For up-to-date grain prices and other relevant information on buying grain, go to Dairy Australia's Grain and Hay Report and Grains2Milk Buying Feed fact sheets in the Farm/ Feeding-cows section on Dairy Australia's web site www.dairyaustralia.com.au.

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Pasture legumes at Boathaugh

by Ron Yates, DAFWA, and John Howieson, Murdoch University

Nitrogen fixation by legumes is a big attraction to farmers in that expenditure on nitrogenous fertilisers is reduced; an issue that is becoming more relevant in today's farming with increasing oil prices leading to higher nitrogen fertiliser costs.

In the March 2010 edition of Feed Trough, we described an experimental field site established at Boathaugh Estate, Karridale, to evaluate nitrogen fixation and growth on a range of alternative pasture legumes mostly new to the area. Even though 2009 was a difficult year, the introduced legumes displayed enormous potential to be developed in the region with good growth and seed set. The annual legumes included hard-seeded French (cv. Margarita) and yellow serradellas (cv. Santorini, Charano), gland (cv. Prima) and Persian clover (cv. Prolific, Nitro), *Biserrula* (cv. Casbah) and a very new species, *Lotus ornithopodioides*. The perennial legumes included new cultivars of *Lotus corniculatus* and lucerne and Sulla (*Hedysarum coronarium* cv. Wilpena). The subtropical pasture species including *Lotononis bainesii* and C4 grasses (Panic, Rhodes and Setaria grass) sadly did not persist or perform.

In 2010, the site received some good early rains in late March and follow up rains through autumn, providing a great opportunity to observe the regeneration of the introduced legumes. The stand out performer was Sulla, which quickly responded to the moisture by re-sprouting from its dormant crown. In addition, there was significant germination and regeneration by the annual legumes, particularly the Persian clovers, serradellas and *Lotus ornithopodioides*. These legumes once again displayed their ability to tolerate insects found in the region (such as weevils, beetles and slugs) with low management.

The site was grazed in late April and once again in early June, with the Sulla providing up to 3 t DM/ha by 15th June. On the 17th June it was decided to prepare the site for silage by over-sowing Currawong wheat over the existing legumes. To control and suppress the broad-leaf weeds (mainly cape weed, *Erodium,* Chick weed, radish) both Broadstrike® and Verdict® were applied. On the 23rd September, with the dry spring, the paddock was cut for silage using a rotary mower. At the time of cutting the Sulla had provided another 7 t DM/ha and the wheat-annual legume mix up to 5 t DM/ha. Protein and energy levels are being evaluated. ■

Milking the most from kikuyu

by Mark Callow, Agri-Science Queensland

With increasing temperatures and day length it is timely to consider management options to optimise the growth and quality of kikuyu. Unlike ryegrass, kikuyu is a C4 grass with a very high potential for dry matter (DM) yield during summer.

The Queensland Forage Plus project showed that kikuyu pasture oversown with annual ryegrass produced in excess of 20 t DM/ha/year. Kikuyu is twice as efficient at water use as perennial ryegrass. Like most C4 grasses, kikuyu is typically high in structural fibre content (neutral detergent fibre -NDF) and low in crude protein (CP) content. When managed correctly to stimulate leaf production, kikuyu can provide nutritional feed for dairy cows during summer and autumn.

Kikuyu performs best under high rainfall (>1000 mm/annum) or supplemented with irrigation. It withstands heavy and frequent grazing, responding well to nitrogen fertiliser and prefers high fertility soils.

A 2-year study evaluating a mixed pasture containing kikuyu oversown with annual ryegrass showed distinct seasonal differences in botanical composition. Ryegrass and white clover dominated the sward during winter and early spring, and kikuyu dominated for the remainder of the year. In year 1, kikuyu accounted for 59% of total utilisation (12 000 kg DM/ha) and ryegrass and white clover accounting for 18 and 23% of total utilisation respectively. In year 2, ryegrass was planted 6 weeks earlier but the yield remained similar at 3596 kg DM/ha, while the utilisation of white clover was halved to 1863 kg DM/ha. Kikuyu utilisation increased to 18 777 kg DM/ha, equivalent to 77% of the total DM production.

Pasture nutritive value reflected the botanical composition. The highest quality was recorded when the proportion of ryegrass and clover were greatest from May to November 2008 when <60% NDF and >20% CP. Quality was lower (up to a maximum of 70% NDF and a minimum of 14% CP) from December to April when the proportion of kikuyu exceeded that of ryegrass and clover. CP and sugar contents tended to decline through the period of the study, associated with an increased kikuyu yield and decreased clover yield in year two.

The goal to managing kikuyu is to maximise quality, achieved by maximising the growth of leaf and not stem. This requires grazing milking cows to remove the leaf followed by defoliating the residual stem by slashing, mulching or grazing with dry cows. Depending on how much kikuyu stem there is in the pasture, it may be necessary to mechanically defoliate 3-4 times within the growing season.

The optimum time to graze kikuyu will be much faster than compared to ryegrass.

Grazing at 4 leaves per shoot, which can be as quick as every 11 days during peak growth, optimised the growth of good quality leaf. ■

More information: download Bill Fulkerson's technical note at www.futuredairy.com.au

For Further Information

National Dairy Australia
Feedbase Projects have a wealth of information about feedbase research & management in WA and other dairy regions available on their websites:

Greener Pastures
www.agric.wa.gov.au/greenerpastures
FutureDairy
www.futuredairy.com.au
Project 3030
www.dairyextension.com.au/project3030.asp
Western Dairy
www.westerndairy.com.au
Dairy Australia
www.dairyaustralia.com.au
www.myG2Mfeedreport.com.au
www.coolcows.com.au
Tasmanian Dairy Demonstration Farm www.tddf.com.au
Beyond 2012
www.tasdairyprojects.com.au

Keep us in the picture!

Are you growing or thinking of growing cereal silage or brassicas - then let us know.

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