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DairyCatch

A Partnership for Sustainable and Profitable Dairy Farming in Western Australia

ENVIRONMENTAL BEST PRACTICE GUIDELINES
3.0 FERTILISER MANAGEMENT

TABLE OF CONTENTS

List of Figures

Back to Main Table of Contents

TABLE OF CONTENTS

Back to Main Table of Contents

3.0 FERTILISER MANAGEMENT

Fertilisers are chemical or organic products containing nutrients that promote plant growth. Modern grazing systems striving to achieve optimum yield and quality place a high demand on soil resources making fertiliser use necessary to maintain high production levels.

Correct fertiliser management involves supplying the right types of fertilisers in the right quantities at the right times to meet pasture requirements. Proper fertiliser management practices reduce fertiliser costs and minimise off-farm environmental effects.

Implementing Good Practice

1. Record keeping. Keep records of soil test results and fertiliser applications. Construct a table listing the date, application rate and type of fertiliser used on various areas of the property. Using a computer to store this information is useful as the records can be easily accessed at any time. Another useful method involves recording the details of your fertiliser applications (date, rate and type) on a paddock map where pasture use, hay and silage harvesting can be later added for comparison purposes.
2. Conducting regular soil and tissue tests. Nutrient application rates need to be matched as closely as possible to pasture requirements. Sample and test each soil type or land management unit in each paddock at least once every three years or prior to reseeding pastures.

   Correct soil sampling technique is crucial to obtain a true representation of the nutrient status in the root zone. The phosphorus retention index (PRI) and reactive iron test both estimate the capacity of soil to retain phosphorus and also indicate the capacity of soil to retain sulphur, copper and zinc. Both tests should be conducted on all soil samples to accurately determine soil nutrient requirements. If you are currently sending your samples to a company that does not do either of these tests you should really consider sending samples to a laboratory that does. PRI provides a direct measure of the soil's capacity to retain phosphorus and is preferred to the indirect estimate provided by reactive iron. If you send your samples interstate, make sure the lab equipment is calibrated for Western Australia.
3. Applying nutrients based on soil or tissue test results. The amount of each nutrient to be applied depends on the amount available in the soil and production level. Pasture response curves plateau after threshold amounts of nutrients have been added. Threshold nutrient rates are those required for optimum production. Putting more on is unlikely to give an economic return and will most probably pollute the environment. Even application rates that closely match plant and soil requirements can pollute the environment if improperly managed.

   Factors that affect soil nutrient requirements include:

   - Soil type, pH, PRI and clay content
   - Fertiliser nutrient concentration, and
   - Plant nutrient uptake
4. Meeting plant needs. Apply small amounts of fertiliser regularly after the break of season. Pasture nutrient requirements are greatest in spring when soil temperatures are favourable for pasture growth and decline over winter as temperatures drop and some soils become waterlogged.

Getting advice from experts can help you make better fertilising decisions

5. Fertiliser selection and placement. Select fertilisers based on their nutrient content in relation to soil and plant requirements. Never fertilise firebreaks or watercourses. Use low water-soluble fertilisers near environmentally sensitive areas.

6. Timing applications. Do not top dress paddocks when they are bare and dry as fertilisers applied under these conditions are easily blown away, washed off or through the soil during heavy rains at the break of the season, particularly if the soils are water repellent or a finely-textured, highly-soluble fertiliser is used. Topdressing pastures is best done after seed germination when the topsoil is moist and pastures are actively growing. Avoid fertilising when intense rainfall is forecast or straight after irrigating. Fertiliser applied to very wet paddocks where water has pooled is likely to be washed away in run-off.

7. Spreader calibration. Fertiliser spreaders must be calibrated so that application rates and uniformity of distribution can be controlled. Regular cleaning, oiling and replacing worn parts will ensure reliable performance. Use only accredited spreading contractors.

8. Fertiliser buffers. When spreading fertiliser, a 20 metre buffer from watercourses should be maintained to prevent direct application to water ways and fertilisers leaching and running off into watercourses, wasting money and causing environmental problems.

   If you flood irrigate, it is important to leave a 20-30 metre unfertilised buffer- zone at the bottom end of each irrigation bay to allow opportunity for the high fertiliser concentration in the irrigating front to be utilised before it reaches the drain

9. Integrating irrigation and fertilisation. Application of fertiliser or effluent with irrigation water is known as fertigation. This practice maximises the uptake of nutrients by the plant, by providing required nutrients in small amounts in a form that the plants can easily use. The nutrients can be distributed more uniformly across the paddock and are supplied directly to the root zone.

   Broadcast fertilisers should be applied to pastures after irrigating, once surface water has drained and there are no pools left on the surface. Directly after fertilising, reduce runoff for two subsequent irrigation events to prevent nutrients being washed into drains.

10. Slow-release fertilisers. There is a need to develop low-soluble phosphorus fertilisers designed for sandy soils in high rainfall zones. These would release nutrients at a rate that closely matches plant nutrient uptake, increasing cost-effectiveness and reducing nutrient loss to the environment.

11. Using dairy effluent. When used and applied correctly, dairy effluent is a valuable source of nutrients and organic matter. Reclaiming the nutrients in effluent will reduce your need for commercial fertilisers.

12. Using nutrient budgets when making fertiliser decisions. Nitrogen and phosphorus budgeting will allow you to better match nutrient inputs (imported feed, fertilisers and effluent) to nutrient outputs (milk, meat, animals, exported feed) by only replacing nutrients removed.

Benefits

- reduced fertiliser costs
- increased farm efficiency by matching nutrient inputs to outputs
- reduced pollution to watercourses and groundwater
- meets community and market expectations of responsible management

Further Information

Dexcel. 2005. Making dollars and sense of nutrient management. The seven steps to success. Available online www.dexcel.co.nz

3.1 RECORD KEEPING

Your history of fertiliser use can help you interpret soil test results and recognise trends in soil fertility. Retaining copies of soil tests over the years can help you spot inaccurate results that may be caused by poor sampling technique. Keeping fertiliser records will help you develop your whole-of-farm plan.

Implementing Good Practice

You should have a site by site record of what you applied and when. Draw up a table for each financial year describing the type, amount, supplier, application area and rate of fertilisers purchased along side pasture and milk yields (kg dry matter/ha or litres/ha). A comments column should be provided to include notes on environmental factors for example rainfall and soil type.

At the end of a farm year or season, a tally of the nutrients applied can be calculated. Fertiliser suppliers provide a nutrient composition table with their products (percentage N, P, K, S, Mg, Ca and trace elements). By breaking down and assessing the nutrient composition of various fertilisers, you or your farm consultant can evaluate the "relative worth" of a range of fertilisers and assess which product will present you with the best value for money. The objective in evaluating different forms of nutrients is to establish the unit cost per kg of nutrient applied, that includes the cost of material, cartage and application costs.


Several basic computer programs can help you keep, retrieve and summarise records

Benefits

- Relate fertiliser expense back to production levels
- Match soil test results and nutrient requirements with most suitable and cost-effective fertiliser
- Demonstrate environmental awareness
- More efficient and responsible fertiliser management

Further Information

Fertiliser Research. 2002. Code of practice for fertiliser use. Available online at www.fertresearch.org.nz.

Soil sampling your entire property every 2-3 years enables you to better match fertiliser applications to soil and crop requirements and reduces the risk of losses caused by over application. Soil testing is the most effective way of assessing the fertility of your soils and is critical to developing a fertiliser program for your property.

Soils measurements provide an indication of the land's ability to supply the nutrients necessary to produce the required pasture yield. They indicate whether additional nutrients should be applied.

Test for nutrient levels and follow the recommended rates. If you add too little fertiliser, your yield and returns suffer; if you add too much, you waste money, time and pollute the environment.

Implementing Good Practice

There are four main phases to soil testing

- Collection of a representative sample
- Laboratory analysis to determine nutrient levels
- Interpretation of results
- Development of a fertiliser program

Collecting representative soil samples

Wear disposable gloves when handling samples to reduce your personal risk of infection.

The greatest source of error in any soil testing program comes from collecting non-representative samples. To ensure this doesn't happen to you

- Check that the soil type and plant growth from where the sample is collected is typical of the whole area, and
- Avoid areas such as stock camps, old fence lines and dung piles
- Use the same sampling lines (transects)

The traditional time to sample dryland paddocks in the south-west is over the summer when pasture growth has stopped. Try to sample at the same time each year because nutrient levels differ at different times of the year. Sample your hardest setting soils first, especially clays that tend to turn hard as rock once they have completely dried out. Sample irrigated pastures at the end of the irrigation season (March-April) or just before it starts up again in September-October. Don't sample within one month of applying fertiliser. Sampling any sooner can give very high, misleading readings.

Take separate soil samples from areas which have

1. Different soil types (clay, loam, sand)
2. Different topography (flat, hilly)
3. Different management (day/night paddocks, hay/silage paddocks)

Keep the samples from each area separate. Do not combine samples from areas with different soil type, topography or management. If you come across an area or paddock that looks different to those you have already sampled, get a new bag or don't sample it at all.

Mark a sampling line for each paddock by painting fence posts at each end. Sample along these lines each time you sample that paddock.

Stay at least 10 m from troughs, gates, stock camps, drains and fences because there tends to be a major build up of nutrients in these areas from dung and urine. Sampling near these areas can provide misleading results. Urine and dung spots can be hard to see.

Use a clean auger (Figure 3.1) or pogo (Figure 3.2) to collect samples. Don't use a spade or trowel - it is difficult to get good samples with them.
Sampling depth is critical. Most nutrients are concentrated in the top 10 cm and the calibration of most soil laboratories is based on a top 10 cm sample. If you want to assess nutrient movement through the soil profile, collect separate samples from the required depths. Phosphorus is immobile in most soils and stays at its depth of application unless the soil is cultivated. In most soils, the concentration of phosphorus and potassium decreases rapidly down the profile.

When sampling, check that cores are the right length (the auger has gone down to the right depth). Cores that are too short or too long will give incorrect readings. Make sure that no soil falls out of the auger as you lift it out of the ground.

Figure 3.1 Soil sampling using an auger

Figure 3.2 A sampling pogo is a metal tube about 2.5 cm in diameter that is pushed into the soil to a depth of 10 cm.

In paddocks containing predominantly one soil type, collect about 40 cores, each 10 cm deep. Clearly mark the paddock name on each sample bag. Mark the sampling line on a farm map. If there is more than one soil type, collect 20 cores from each type. These should then be bulked and mixed thoroughly and a sub-sample of 500 g sent for analysis. Where differences in soil are obvious, either sample each area separately and submit more than one sample from that paddock or only sample the major soil type. Send samples away the same day for testing. If this is not possible, keep samples out of the sun and store them in the fridge overnight.

To recap:

- Ensure each core is taken to the full sampling depth. If stones or other matter prevents the sampling tool from going to its full depth, this sub sample should be discarded and another taken.
- Avoid sampling in very wet conditions.
- Short cuts in sampling such as taking only one or two cores, a handful, or a spadeful of soil will give misleading results.
- Avoid contaminating the sample and equipment with fertilisers or other nutrient sources.

Analysis and Interpretation

A number of laboratories provide soil and plant tissue analyses services. Laboratory analyses of soil samples are usually very accurate with errors mainly caused by poor sampling technique.

The major benefits of soil testing are realised when results are used in conjunction with other information such as fertiliser history, soil type, rainfall, changes in nutrient levels over time and pasture productivity during the growing season. Western Australian soils are unique. Results derived using techniques not calibrated for WA are useless.

Nutrient Soil Test Standards

The tables below are provided as general guides to help you understand your soil test results. Discuss your test results with your farm consultant or an experienced agronomist prior to making any fertiliser decision.

Augers make sampling hard-setting soils much easier

Soil type is one factor that strongly influences fertiliser requirements. Table 3.1 summarises how different soil types can affect fertiliser requirements.

Table 3.1 Relative fertiliser requirements of different soil types.

Soil Type	Relative Requirement		
	P	**S**	**K**
High fixing soils **Clays** • Brown to black clays (bungham clays) **Loams** • Red to yellow-brown loams (karri/marri loams) • Loamy duplex soils (wandoo/marri/flooded gum loams) **Gravels** • Yellow-brown gravelly loams (jarrah/wandoo gravels) • Red-brown gravelly loams (marri/karri gravels)	High	Nil to Low	Possible
Medium fixing soils **Loams** • Grey brown loams (marri/paperbark loams) **Gravels** • Yellow brown gravely sands (jarrah/banksia gravels) • Bleached (grey) gravely sands • Shallow, sandy duplex soils (less than 30cm sand over clay)	Moderate	Moderate	Probable
Low fixing soils **Gravels** • Bleached (grey) gravelly sands (jarrah/banksia gravel) **Sands** • Grey-brown sands (paperbark sands) • Deep, sandy duplex soils (more than 30cm sand over clay	Low	Low	Highly likely
Very low fixing soils • Deep bleached (grey) sands (banksia sands)	May be unprofitable to fertilise		

A grading system is generally used to describe nutrient status from soil test results (Table 3.2).

Table 3.2 Grading System terms to describe soil nutrient status

Nutrient Status	Fertiliser Requirement	Anticipated Plant Growth Response
Low	High	Large growth response - over 15%
Medium	Maintenance dressing only	Small growth response
High	No economic need for fertiliser Replace nutrient losses	Little or no growth response from additional nutrients

Reactive iron and phosphorus retention index (PRI) are chemical tests used to measure the soil's ability to hold or fix phosphorus. Indicative values for these tests are presented in Table 3.3.

Table 3.3 Indicative values for soil phosphorus status

Phosphorus fixing level	Reactive iron (ppm)	PRI	Soil phosphorus levels (ppm)		
			Low	Medium	High
Very low	1-100	Below 2	Below 7	7-10	10+
Low	101-200	Below 2	Below 8	8-13	13+
Low/medium	201-400	2-7	Below 15	15-20	20+
Medium	401-800	8-15	Below 20	20-25	25+
Medium/High	801-1600	16-35	Below 25	25-35	35+
High	Above 1600	Above 35	Below 30	30-45	45+

Indicative values for soil potassium status for hay and silage production are presented in Table 3.4.

Table 3.4 Indicative values for soil potassium status for hay and silage production

Status	Potassium level (ppm)
Low	Below 80
Medium	80-120
High	120+

Reactive iron and PRI can both be used to estimate a soil's ability to retain sulphur and predict its responsiveness to sulphur fertilisers. Indicative values are presented in Table 3.5. Other important factors include depth to subsoil, intensity of winter rainfall and fertiliser type. Sand over clay with the sand layer 20-30 cm deep often responds to sulphur. Fertilising these soils with superphosphate, gypsum or sulphate of ammonia is recommended. Alternatively, a slow release sulphur fertiliser can be used in autumn.

Table 3.5 Indicative values for soil sulphur status

Reactive iron (ppm)	PRI	S retention	Anticipated plant response to S application
1-200	Below 2	Very low	33%+
201-400	2-7	Low	25-33%+
401-800	8-15	Medium	12-33%
801-1400	16-30	High	12-25%
1400-1600 plus	Above 30	Very high	Nil

Indicative soil acidity values presented as pH ($CaCl_2$) and recommended remedies are provided in Table 3.6.

Table 3.6 Indicative values for pH ($CaCl_2$)

pH ($CaCl_2$)	Recommendation
below 4.3	Lime needed- especially if cultivating
4.3 – 5.5	Marginal need for lime
5.5 plus	No need for lime

The effect of soil salinity on pasture productivity is presented in Table 3.7.

Table 3.7 The effect of soil salinity as estimated by conductivity levels (in milliSiemens per metre) on pasture productivity.

Soil type	Percent reduction in pasture growth			
	Nil	10%	25%	50%
Heavy soils				
Clover	19	29	45	71
Perennial ryegrass	70	86	111	152
Medium soils				
Clover	13	20	32	50
Perennial ryegrass	49	61	79	108
Light soils				
Clover	8	13	20	31
Perennial ryegrass	31	38	49	67

Further Information:

Arkell, P. 1995. Productive pastures pay. A manual on pasture establishment and management for the above 700mm rainfall zone. Department of Agriculture and Food Western Australia.

Bolland, MDA, C Gazey, A Miller, D Gartner and J Roche. 2004. Subsurface acidity. Bulletin 4602, Department of Agriculture and Food Western Australia.

Brennan RF and MDA Bolland. 2006. Soil and tissue tests to predict the potassium requirements of canola in south-western Australia. Australian Journal of Experimental Agriculture 46, 675-679.

Dexcel. 2005. Making dollars and sense of nutrient management. The seven steps to success. Available online www.dexcel.co.nz

Summers, R and M Rivers. 2002. Soil testing: a guide to fertiliser use. Farmnote 69/2002. Available online at www.agric.wa.gov.au

3.3 TISSUE SAMPLING & TESTING

Plant testing is important as a monitoring tool to assess the effectiveness of fertiliser programs indicated by soil tests. Tissue analyses confirm if plants are obtaining enough nutrients for optimal productivity and animal nutrition but results can't be used for estimating fertiliser rates.

Plant nutrient status within any given variety differs according to plant age, the plant part tested and weather conditions.

Implementing Good Practice

Detailed sampling procedures that relate to optimum growth stage for most crops can be obtained from fertiliser representative and agricultural consultants. However some broad principles apply.

- Always wear a fresh pair of disposable gloves for each paddock you sample to reduce the risk of sample contamination
- Proper sampling is important, preferably along the same transect used to collect soil samples. Samples of top growth should be collected and should include most of the youngest (newly grown) herbage
- Do not sample disease, insect or mechanically damaged plant tissue. Remove all dirt by shaking or washing the sample with water
- Place the tissue in a clean paper bag. Do not use plastic bags. If the sample is wet or succulent, let it air dry in the open for one day before sending it to the laboratory
- Clearly label bags with date and location of sample
- When using tissue analysis in the diagnosis of crop production problems, take one sample from the problem area in the paddock and one from the area where plants appear normal

Indicative concentrations of various elements in plant tissue are presented in Table 3.8. Sub-clover pasture levels of cobalt, copper and selenium for cattle production are presented in Table 3.9. The most important nutrients for sub-clover are phosphorus, sulphur, potassium and molybdenum.

Table 3.8 Indicative values of various elements in plant tissue

Nutrient	Deficient	Questionable	Adequate	Comment
Nitrogen (%N)			3.0-5.0	
Phosphorus (%P)	Below 0.2	0.2 - 0.25	0.25 - 0.40	Very mobile in plant
Potassium (%K)	Below 1.0	1.0	1.0-2.0	Early to mid flowering
	Below 1.5	1.5	1.5-2.0	Before flowering
Sulphur (%S)	Below 0.18	0.18-0.2	0.2-0.3	Lowest in young leaves
Calcium (%Ca)	Below 0.18	0.20	0.4-1.0	Acidity symptoms develop first
Magnesium (%Mg)	Below 0.10	0.10	0.1-0.3	Rare in W.A
Copper (ppm Cu)	Below 3	3.0-4.0	Above 4.0	Animals need greater
Zinc (ppm Zn)	Below 12	12-14	15-30	OK for animals
Magnesium (ppm Mn)	Below 18	18-25	25-100	OK for animals
Iron (ppm Fe)	Below 100	100	Above 100	Rough guide
Molybdenum (ppm Mo)	Below 0.05	0.05-0.1	0.2-1.0	Costly analysis
Boron (ppm B)	Below 12	15-20	20-50	Rare in W.A

Table 3.9 Subclover pasture levels of cobalt, copper and selenium for cattle production

Nutrient	Deficient	Marginal	Adequate	Comment
Cobalt (ppm Co)	Below 0.07	0.07	Above 0.1	Critical level for plants is 0.03 ppm. When cobalt or copper are present at healthy levels for clover but inadequate for animals, dose animals or apply fertiliser.
Copper (ppm Cu)	Below 4.0	5.0-7.0	7-12	Copper levels are for plants with normal molybdenum (0.5-1.0) and sulphur (0.2%) levels. At higher molybdenum and sulphur levels, higher copper levels are needed.
Selenium (ppm Se)	Below 0.01	0.01-0.03	0.03-0.1	Selenium levels in Western Australian pastures are often below the international standards yet selenium deficiency in livestock is rare and sporadic. Rectify selenium deficiency by dosing animals or applying fertiliser

Further Information

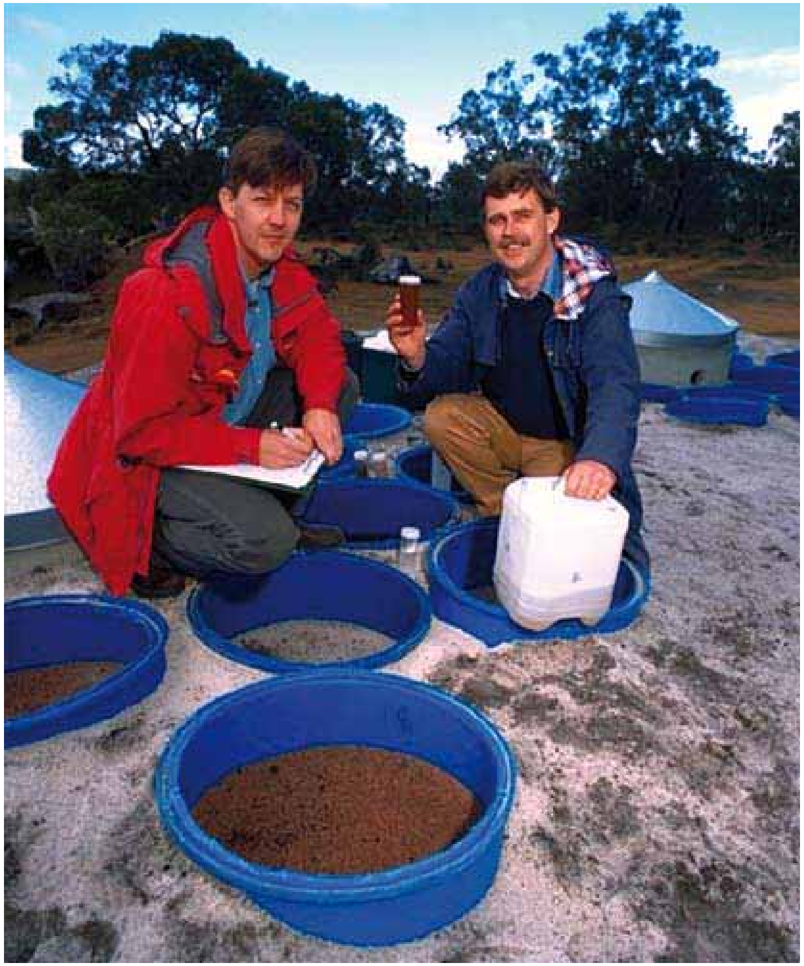
Arkell, P. Productive Pastures. A manual on pasture establishment and management for the above 700mm rainfall zone. Department of Agriculture, Western Australia.

Bolland, M. 1996. Tissue testing for phosphorus. Farmnote No. 32/96. Available online at www.agric.wa.gov.au

3.4 CHOOSING THE RIGHT FERTILISER AND APPLICATION RATES

Correct fertiliser management involves supplying the right nutrients in adequate amounts for optimal pasture production and least environmental impact. Once you have completed your soil and plant testing and have some idea as to what nutrients will improve your pasture's productivity you are going to be faced with deciding what particular fertiliser to apply and at what rate. Different fertilisers contain different nutrients present in a variety of concentrations and forms. Your farm consultants and fertiliser suppliers are currently your best sources of information and advice.

The Better Fertiliser Decisions project that started in 2003 aims to deliver regionally specific and scientifically validated fertiliser production responses for various pasture types, climatic zones and soil conditions in WA. This national initiative has been supported by Dairy Australia, Land and Water Australia, the Fertiliser Industry Federation of Australia, Incitec-Pivot, CSBP, Hifert, Canpotex-Agrow, Impact Fertilisers and the WA Department of Agriculture and Food, among others.



The Greener Pastures project currently underway at the Vasse Research Centre aims to clearly define the milk production response to nitrogen fertiliser in a pasture system and improve local understanding of the rate and pathways nitrogen is lost. The objective is to provide practical management strategies to delivery higher nitrogen use efficiency and profitability while reducing losses to the surrounding environment.

Further Information

Better Fertiliser Decisions Project.
Online at www.dpi.vic.gov.au/dpi/nrensr.nsf

Greener Pastures Project.
Online at www.agric wa.gov.au

3.5 TIMING FERTILISER APPLICATION

Applying fertilisers, especially nitrogen and phosphorus, at the right time of year can really increase their cost-effectiveness and reduce their potential to pollute the environment.

Implementing Good Practice

Fertilisers work best when applied to growing plants at rates that match plant needs. Only germinated and actively growing pastures should be fertilised to avoid losses through run-off and leaching caused by heavy rains at the break-of-season. Light rains prior to break-of-season-proper do make nutrients available in the soil solution, but if heavy downpours take place between this application and seed germination, you and the environment will be the big losers.

Apply nitrogen fertilisers to dense ryegrass pastures in autumn, two to four weeks after germination. Listen to weather forecasts before applying nitrogen fertilisers to avoid heavy rain events shortly after applications. Apply nitrogen to ryegrass for silage or hay six weeks before cutting.

To reduce leaching losses, fertilise sandy soils low in phosphorus with phosphatic fertiliser after the break of season (May/June). Fertilise the high fixing soils such as loams, gravels and clays with phosphatic fertiliser at the break of the season. Split applications in autumn and spring are the best option for maximum productivity. Autumn applications are able to increase pasture growth in autumn and winter when there is usually a feed shortage, and application to dry firm land helps avoid fertiliser burn and bogging.

Apply phosphorus on irrigated pasture early in spring, three weeks before the first irrigation, or just after.

Further Information

Department of Agriculture. 1995. Productive pastures pay. A manual on pasture establishment and management for the above 700mm rainfall zone. Department of Agriculture and Food Western Australia.

3.6 CALIBRATING FERTILISER SPREADERS

Fertilisers are a major expense in the farm budget. Over application of fertilisers is not only wasteful, it can harm the environment. It pays to spend a few minutes setting the spreader up and getting it right. A bit of effort at the start of the procedure can save you a great deal of trouble later.

It is vital that your spreader equipment is tested to ensure its accuracy. Inaccurate spreading can cause loss in yield and uneven pasture growth that both impact significantly on your profitability.

Implementation

Most manufacturers supply information on how to calibrate their equipment. In regards to rate of application, some spreaders today come with load cells that tell you the weight of product dispensed. This information coupled with an odometer reading (m) and the width of your applicator (m) can be used to calculate application rate (kg/m^2). Multiplying this value by 10,000 will give you kg/ha. Alternatively, you can measure the distance needed to distribute a known quantity of fertiliser (say 50 kg) and divide this by the width of your applicator (m) to calculate rate of application.

When testing your spreader's rate of application, make sure you measure under normal operating conditions for speed, gear and engine load.

Fertiliser spreaders should also be tested for evenness of fertiliser distribution by driving over a series of collection trays three times and weighing the quantity of fertiliser in each tray relative to its position from the centre of the spreader. The weight difference between trays is called the coefficient of variation (CV; Table 3.10).

Table 3.10 Coefficient of variation (CV) of evenness of fertiliser distribution and corresponding spread pattern ratings

CV	Spread pattern rating
Less than 10%	Excellent
10-14%	Good
15-17%	Borderline
18-20%	Reduced pasture productivity
More than 20%	Pasture striping evident

The spreading capabilities of broadcast fertiliser equipment, and in particular those of professional contractors, can be tested and accredited under the Accu-Spread® system, that is part of the FertCare® initiative, jointly developed by the Australian Fertiliser Services Association (AFSA) and the Fertiliser Industry Federation of Australia (FIFA).

The Accu-Spread testing process involves driving the spreader over a line of 40 equal-sized collection trays while discharging product. The machine passes over the trays three times and the contents of each collection tray are then weighed (noting the location of each tray in relation to the centre of the spreader). The data is then entered into a computer and a graph is created, showing the spreading pattern in terms of width and quantity of product. Based on a variation target of less than 15%, a recommended spreading width can also be determined for the machine.

Once a machine has been tested and accredited, certificates showing the spread pattern are issued and should be made available to all customers. This will allow you to know exactly how your fertiliser is being spread. You may want to actively seek FertCare® accredited businesses, staff and machinery if you next plan to use a contractor to spread your fertiliser.

Most fertilisers are corrosive to steel. Ammonium nitrate and muriate of potash are corrosive to brass.

Clean bins, augers and applicators after use and oil where recommended.

Further Information

Australian Fertiliser Services Association. Online at www.afsa.net.au

Fertiliser Industry Federation of Australia. 2001. Guidelines for developing a nutrient Management Code of Practice for your Industry, Region or Farm. Fertiliser Federation Industry of Australia, Canberra. Online at www.fifa.asn.au

3.7 FERTILISER BUFFERS ZONES

The granular fertilisers currently available all readily dissolve in water. Because of this, fertiliser-free buffer zones are required to prevent nutrient-rich surface run-off from entering small drains and natural watercourses from where nutrients can be quickly transported to larger streams and rivers.

Implementing Good Practice

The narrower the buffer zone, the greater the likelihood of nutrients entering waterways or being lost as runoff. The wider the buffer, the more effective it will be for stripping nutrients. However a buffer that is too wide will compromise production.

The ideal width of any fertiliser buffer zone relates to the likelihood of frequent flooding, the slope of the land and the presence and type of vegetation in the zone. The ideal buffer zone is one that traps the majority of nutrients without compromising pasture productivity. As a general rule, the wider the buffer the greater the protection and the more diverse the buffer vegetation, the better the protection. In winter, leave a 10 to 15 metre unfertilised buffer alongside all watercourses. For small, seasonally dry water channels buffers should be no less than 10 m wide each side, grading up to at least 40 m wide each side for larger stream zones.

If you irrigate your pastures properly using sprinklers, the likelihood of runoff occurring is low and fertiliser buffer zones can be narrow. However if you flood irrigate, a buffer zone of 20-30 metres is needed at the bottom of bays to allow for the irrigating front (high fertiliser concentration) to be mopped up before it reaches the drain.

Streamlined main drain in Waroona

Further Information

Australian Fertiliser Services Association. Code of practice for spreading. Online at www.afsa.net.au/html/spreading. Sited 24/11/04

Bryant, C and J Jackson. 2000. Wetland and streamside management Online. DPIWE.www.bushcare.tas.gov.au/care.

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Thompson, C and R Standen. 1998. Managing Nutrients on Irrigated Dairy Farms. Goulburn Broken Catchment Management Authority. Prominent Press, Victoria.

3.8 SLOW-RELEASE FERTILISERS

Slow-release and low water-soluble phosphorus fertilisers provide pastures in high rainfall zones with a slow and steady source of nutrients that closely matches pasture growth requirements. Currently, there is only one slow release fertiliser commercially available in WA.

The Western Australian Department of Agriculture and Food and others are working to develop slow release fertilisers specially suited to sandy soils that receive high rainfall.

Old Coastal Superphosphate was a slow-release phosphorus and sulphur fertiliser suited to the leaching grey sandy soils of the Swan Coastal Plain. New Coastal Superphosphate is available but the phosphorus is just as soluble as ordinary superphosphate; only the sulphur is less soluble.

Red Coat is a bauxite residue used to coat granules of single superphosphate to reduce phosphorus leaching in high rainfall pastures with coarse, sandy soils. Research has shown that this coating reduces the water solubility of the fertiliser and keeps it near plant roots where it can be effectively used for more than two years. Red Coat fertilisers may become commercially available in the future.

Further Information

Arkell, P.1989. Improved fertilising practices on the Peel-Harvey Catchment. Journal of Agriculture. 30:96-101