BOOSTING WINTER FEED WITH NITROGEN.

Bruce Lewis

After a late Autumn break it's looking like a tough winter for pasture feed and with fodder reserves low and grain prices high it's worth reviewing the nitrogen option. Ryegrass pastures give the best responses to nitrogen compared to other pasture species with short rotation ryegrasses giving higher responses again. Trials have shown responses of 10kg/ha of dry matter per kg of applied nitrogen is generally achievable in most situations with reasonable fertility and pasture species. Dairy trials by Richard Eckard and Frank McKenzie from the DPI have found higher responses are achieved where pasture species and soil fertility is optimum. Mid winter responses may be lower than 10 with spring responses giving higher responses approaching 20kg/ha of dry matter per applied kg of nitrogen. Short term – annual ryegrasses will give higher responses greater than 20kg/ha of dry matter per kg of applied nitrogen in optimum situations.

NITROGEN OPTIONS

Urea is the cheapest form of nitrogen however ammonium phosphates like DAP also supply a cost effective form of nitrogen if applying phosphorus with the nitrogen application. Urea costing $500 a tonne, supplies 460kg of nitrogen per tonne hence the nitrogen costs presently costs out at $1.09 per kg of nitrogen. Allowing for spreading and freight costs nitrogen applied in the paddock will be around $1.26 per kg. With a response of 10kg/ha dry matter per kg of applied nitrogen, this equates to a cost of $126 a tonne which, when compared to present grain and fodder prices this is a cost effective feed source. Optimum fertile pastures with higher nitrogen response rates will produce feed for lower cost. Sulphate of ammonia is an easy option to supply available sulphur with a nitrogen application by blending with urea. Soils with marginal sulphur levels can produce a better nitrogen response with a sulphur/nitrogen interaction with some applied sulphur. Straight sulphate of ammonia contains 19% nitrogen versus urea which contains 46% nitrogen hence straight sulphate of ammonia is an expensive form of nitrogen (about double urea N cost).

Contents:

An action plan for growing winter feed with nitrogen 1
Fertiliser Response Strips 2
Welcome Back Bruce 2
Slugs: Prevention better than cure 3
Farewell Jake 3
Nitrogen for crops this year - Deep nitrogen testing 4
Winter Cleaning Pastures 5
Don't Forget Copper and Zinc 6
Onion grass in pasture 7
Grazing winter cereals 7

VOLATILISATION

Nitrogen losses can occur as ammonia volatilisation from urea in warmer months where there is insufficient moisture to move nitrogen into the soil, and air movement at ground level combines with low pasture cover. Between May and November urea volatilisation losses are generally too small to be of economic concern. Agrotain can be coated on urea granules to reduce volatilisation losses.

DENITRIFICATION

Nitrogen losses can be significant in water logged soils due to denitrification. Avoid applying high rates of nitrogen to water logged soils. If soils are near field capacity for water holding, avoid applying nitrogen before heavy rainfall events during late winter. Free draining soils can be susceptible to nitrate leaching. Lighter rates of nitrogen and use of urea rather than nitrate N forms will help to reduce N leaching losses.

NITRATE TOXICITY

Nitrate toxicity can occur due to elevated nitrate levels in annual and short rotation ryegrass if grazed from 5 to 15 days after application. Perennial ryegrass is not considered to accumulate toxic quantities of nitrate. Care should be taken with grazing pastures with elevated nitrate levels with hungry cows not adapted to higher nitrate levels. (Nitrate accumulating weeds such as capeweed and deadly nightshade need particular caution).

FOR BEST RESULTS

Pasture height at time of applying nitrogen of 5cm (1500kg/ha DM) will give the optimum response. Both shorter and longer pasture reduces the response. Sheep pastures should be over 1000kg/ha and dairy pastures over 1300kg/ha to ensure there is sufficient leaf area to obtain a quick response.

Nitrogen Lookup Table for Western Victoria (compiled by Frank McKenzie DPI)

Average N Response (kgDM/kgN)

PASTURE INDEX	Jan*	Feb*	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov*	Dec*
Low				5	5	4	4	7	8	8		
Medium	9	9	9	8	7	5	5	8	14	14	11	11
High	14	14	14	10	9	8	8	12	20	20	15	15
Response time (days)	21-32	21-32	25-35	28-36	28-42	36-90	21-32	18-28	14-28	14-21	14-28	18-32

*Assumes Irrigation
Low = <30% ryegrass, Olsen Phosphorus <12 ppm, Colwell K <80ppm, pH(w)<4.5
High = >60% ryegrass, Olsen Phosphorus>25ppm, Colwell K > 275ppm, pH(w)>5.5

FERTILISER RESPONSE STRIPS

Rebecca Stewart

This year Vickery Bros. have set up fertiliser response strips at a variety of our clients' properties throughout the Western District. Each of our clients have different soil type and pasture species which assists us in gaining a representative sample of the fertilisers applied. The response strips have been set up at the following farmers' properties; David and Tom Lewis, Darren Jeal, Stuart Croft, Murray Hauesler, Lindsay Morton, Peter Wettenhall, John Tindall and Guy Robertson. By observing these strips over the varying farming systems, we are looking to compare the responses between different forms of potassium, phosphorous, nitrogen, sulphur and soil conditioners.

These response strips will be used in conjunction with soil tests to observe what nutrients are limiting within the soil. The existing pasture base will be a key factor in achieving a visual response. As we all know improved pastures are very responsive to fertiliser applications and returns to the farmer can be much higher than that of unimproved pasture species.

Throughout the year these response strips will be monitored and if there are significant differences between the growth and composition of the strips, we will do some dry matter cuts to get some figures of how the pasture performed under the influence of the applied nutrients. Although we will be monitoring the pastures throughout the year, it must be kept in mind that these response strips should be preserved as an ongoing demonstration to see the responses of fertiliser and its impact on pasture species over a period of time. These demonstration sites need to have livestock excluded with a temporary fence in early spring to allow any differences between plots to be identified.

Vickery Bros. have also been involved in Dairy SA trials at Mount Gambier. These trials are measuring dry matter production over winter and the aim is to grow the most feed for dairy cattle under irrigation in the shortest time possible. High winter growth is essential as the pasture species trialled only have a limited time to grow (March – November), before taking them out for corn production. The trial consists of new and old varieties of ryegrass, forage barley and ryecorn mixed with ryegrasses. These will be monitored throughout the season and data will be produced from the trial to show which feed yields the most dry matter for the dairy cattle.

If you are interested to see any of these demonstrations throughout the year, please contact your agronomist at Vickery Bros. to organise a viewing.

WELCOME BACK BRUCE

We are pleased to announce that Bruce Lewis has returned to the Vickery Bros. agronomy team. Bruce has spent the last 7 years farming full time and now that his son is taking on more of the farming responsibilities, Bruce is back. Bruce brings with him 36 years of experience in the agricultural industry, including 14 years as an agronomist with Pivot Fertilisers where he conducted extensive research and development trials and worked with different sources and forms of nutrients we use in fertilisers today whilst being the Regional Manager for the Western District, 12 years involvement with Grasslands Society (including Conference Convenor, Secretary and President) and 5 years with Vickery Bros as a senior agronomist. Bruce has a wealth of knowledge and experience and, having worked with us previously, has stepped back into our agronomy team with ease. We are delighted to have such an experienced and popular agronomist back with Vickery Bros. Bruce is looking forward to working with our agronomy team, mentoring the new members of the team and establishing strong relationships with our clients.

SLUGS: PREVENTION BETTER THAN CURE

Harry Armstrong

Most of us expected to see fewer issues with slugs this year due to the long dry summer. While the slug population may not be quite as bad as in past years, there are still some present in new sown pastures and crops.

Each year we see poorly established pastures on heavy clay soils. Results vary from patchy establishment to complete failures. Disappointing results are often blamed on things such as sowing depth, too dry, too wet, poor seed, rough seedbeds etc. While these usual suspects can lead to failure of pastures to establish on these difficult soils, the overwhelming culprit is slugs.

Slugs are usually not a problem on very sandy soils as they can't seem to cope with the grit contained in these soils. However they thrive on the heavier soils. This is why we see areas where the new sown grasses and clovers are thriving in a few spots of lighter soil in a paddock but nothing appears to be growing in the heavy soil on the rest.

Slugs are very difficult to find in daylight as they hide under clods and in sowing slots only emerging at night to feed on newly emerging seedlings. It doesn't take many slugs to cause significant damage, 2-3 slugs per square metre are enough. Seedlings eaten by slugs rarely recover, so controlling slugs and resowing is often the only option.

Slug bait is available from local retailers. Slugout or Metarex are the commonly sold baits. The water resistant pellets are more costly. Application rates are 3-5kg/ha. Some of our clients reported better results when they applied the cheaper non water resistant pellets at a higher rate or a repeated application. Small bait spreaders are available from retailers or Vickery Bros can blend pellets with fertiliser and spread with spreader trucks/land cruisers if required.

Another option is to sow some slug pellets with the seed. Whatever you can do to prevent the damage these pests do will pay big dividends. The seed cost alone for pasture varieties such as summer active tall fescue, new rye grasses and the like is $250-$350/ha.

Prevention is better than the cure!!

FAREWELL JAKE

After 16 years of exceptional service with Vickery Bros, John Jacobson has decided to pursue other interests. Jake started working with Vickery Bros in 1997 as Logistics Manager where he managed a fleet of 9 spreaders. Jake has seen the business grow dramatically over the time and in the end was organising 11 trucks and 13 spreaders. He developed many strong relationships with farming clients throughout the Western District and will be missed. We wish Jake all the best and thank him for his outstanding efforts over the past 16 years.

David Vickery has taken over the role as Operations Manager and has settled in and is looking forward to the many challenges that lie ahead.

NITROGEN FOR CROPS THIS YEAR – DEEP NITROGEN TESTING

James Stewart

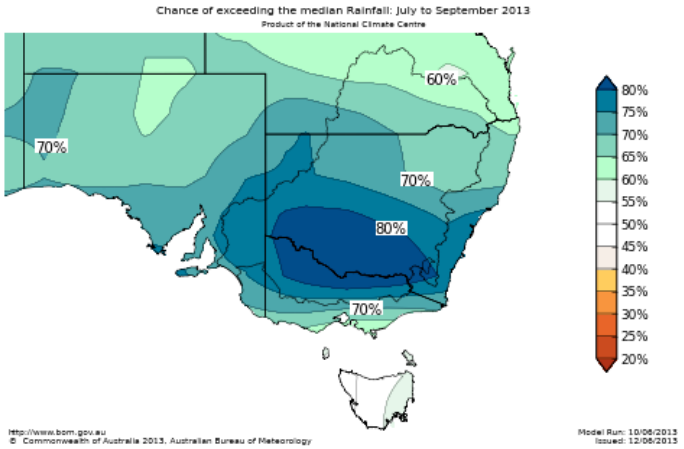
Nitrogen nutrition on cereals and canola is a key management issue in optimising yield and protein and hence profitability. Too much applied nitrogen can cause excessive vegetative growth and tillering where the crop sets up for a high yield which is unable to be achieved if moisture availability does not match the yield potential. Too little nitrogen supply for a crop will results in lower yields and / or protein as insufficient nitrogen is available to grow the crop to it's potential. Crops with weed or disease issue's will also have lower yield potential hence nitrogen requirement.

In the Northern cropping area's moisture most often dictates potential yields and hence nitrogen use. In southern Victoria excess rainfall and water logging can reduce crop yield potential if drainage systems are not in place. Rainfall and soil moisture needs to be considered when setting target yields for nitrogen calculations. The most recent rainfall outlook by the bureau of meterology for the 3 months from July to September is a 65 – 70% chance of wetter than average rainfall. Northern cropping areas have also had some useful rainfall early in the growing season

WETTER CONDITIONS MORE LIKELY FOR SOUTHEAST AUSTRALIA

SUMMARY

- A wetter than normal season is more likely for mainland southeast Australia
- Climate influences include a developing negative Indian Ocean Dipole, a neutral-to-cool tropical Pacific, and warm sea surface temperatures around the coast of Australia
- Outlook accuracy is low through parts of central and western SA, and moderate elsewhere.



As it is difficult to predict rainfall, applying nitrogen through the growing season as the crop develops reducers the risk.

Regular cropping will use up soil nitrogen reserves and reduce potential nitrogen mineralisation through the growing season. Crops after pasture will have higher reserves and nitrogen mineralisation potential while winter cleaned pastures with high legume content will be higher again.

Table 1 – Estimated within-growing –season mineralisation rates in southern NSW cropping soils (based on estimates of Mark Peoples, CSIRO Canberra).

Fertility Status of soil	Nitrogen (kg/ha) which becomes available during the growing season
Low e.g. continuously cropped, low use of N fertilisers, N deficiency common in crops, < 0.08% topsoil total N.	60
Medium e.g. crop-pasture rotation, 2nd or 3rd crop into the rotation, moderate use of N fertilisers, 0.08-0.12% topsoil N.	80
Moderate-high e.g. 1st crop after pasture, moderate clover pasture containing at least 20-30% clover, moderate use of N fertiliser, > 0.12% topsoil N.	100
High fertility e.g. 1st or 2nd crop after winter cleaned pasture of high legume content (>50% legume content), > 0.12% topsoil total N.	160

Nitrogen benefits from sub clover break down, is quicker than lucerne. Prior lucerne will give 2-3 years benefit while sub clover will benefit for 1-2 years.

Now let's look at the summer/autumn just gone, hot and dry with very little summer rain. Meaning there has been very little mineralisation of nitrogen from soil organic matter.

A tool that has been around for some time and gets overlooked is a deep soil N test. This test measures the plant available nitrogen already in the soil from a sample taken from 0 to 60cm. This available nitrogen is the sum of nitrogen carried over or mineralised from the past 2 -3 seasons.

To allow comparison of results between different paddocks, and also to allow you to compare the differences in N availability between years, I recommend you do a deep N test in June-July (earlier or sowing time if it gets too wet).

Like 0-10cm soil tests, deep N samples should be taken from a representative area of the paddock, that is keep to the main soil type and avoid headlands, stock camps, trees and old fence

lines. If soil types are markedly different and you can tailor N applications, sample soil types separately.

Using monitoring tools such as deep soil N testing and N budgeting will ensure that fertiliser applied to crops will provide maximum production benefits with minimal environmental impact.

Table 2 – Nitrogen budget based on a June deep soil N test to 60cm depth

		Example	Your calculation
CROP DEMAND			
	Target yield	4t/ha	
Multiplied by	Target Protein	X 12%	
Multiplied by	Correction factor	X 2.34	
Equals	N-demand	112kg/N/ha	
SOIL SUPPLY			
	Measured soil mineral N in top 60cm	80kg N/ha	
Add	Estimated nitrogen from mineralisation during crop growth	80kg N/ha	
Equals	Gross N supply	160kg N/ha	
Less	Assume 50% taken into plant (excluding roots)	-80kg N/ha	
	NET N SUPPLY	80kg N/ha	
FERTILISER NEEDED			
Subtract soil supply from crop demand	Net extra N required	112-80=32kg N/ha	
Crop demand: multiply by 2	Fertiliser N needed (assuming 50% efficiency of N recovery)	32 x 2 = 64 kg N/ha (urea at 139kg/ha)	

Matching plant demand with fertiliser N supply is important for a number of environmental and economic reasons. Nitrogen can be lost in 3 main ways.

- Volatilisation (gaseous losses of N) can be high in warm conditions, particularly from topdressed urea with no follow-up rainfall to wash the urea into the soil. Urea can now be treated with Agrotain to significantly reduce volatilisation losses.
- Denitrification losses occur on warm waterlogged soils however recent trials at the PVI at Hamilton found quite high losses where soils were cultivated in association with water logging. Effective drainage systems and minimal cultivation will reduce these losses. Denitrification is the conversion of nitrate N (plant available form) to gaseous N as nitrous oxide. Nitrous oxide has a global warming potential 310 times that of carbon dioxide so there are strong environmental reasons to minimise these losses.
- Leaching loss of nitrate nitrogen from out of the root zone can occur in wet years.

WINTER CLEANING PASTURES:

Harry Armstrong

Silver grass and some other difficult to control pasture weeds can often be controlled in June/July by using a mix of Simazine & Nuquat.
However with the late break situation and quite severe winter feed shortage on most farms this season, this is probably a tool best left in the tool box this year.

There could be situations where it could be used later (Aug/Sept) in a year like this perhaps on paddocks that have been used as sacrifice areas.

DON'T FORGET COPPER AND ZINC

Bruce Lewis

Copper and zinc are two trace elements which can have a significant effect on crop yields in some situations. Both are trace elements and are required in small quantities. Zinc deficiency shows up earlier than copper deficiency. Copper and Zinc are two of eight trace elements nutrients essential for plant growth and reproduction. Copper is necessary for chlorophyll formation in plants. Meaning: Chlorophyll is the green colouring matter of leaves and stems of plants. This matter is essential to the production of carbohydrates by photosynthesis.

Foliar trace elements can be added with herbicides or with fungicides for later applications (copper).

Seventy percent of the copper in plants is found in the chlorophyll. Plants well supplied with copper have stronger cell walls, higher polymers and proteins are formed and consequently more resistant to fungal attacks. Copper is also involved with enzyme processes meaning digesting certain organic substances to produce proteins. Copper is involved in pollen formation and flowering. Wheat plants low in copper appear to be wilting during vegetative growth even when moisture is adequate. Rat tail heads can be seen at maturity due to infertile heads.

While zinc is involved in synthesis (combining) of plant growth substances like copper, it's also involved in enzyme systems, the production of chlorophyll and carbohydrates. Zinc is very important early in the plants life cycle. Zinc deficiency symptoms often show as longitudinal pale green stripes on each side of the mid-vein of fully-emerged leaves.

Application of zinc or copper with fertiliser to the soil can give longer term residual benefits. Distribution of soil applied trace elements is important since the elements are not mobile in the soil. Soils with high pH (alkaline) will reduce the availability to plant of both copper and zinc.

Contributing factors to copper deficiency

- Light textured soils with low organic matter
- Wheat is more sensitive than barley which is more sensitive than oats
- Wet water logged soils
- Root pruning from group A and group B herbicide damage
- Applications of fertiliser nitrogen in marginal copper situations
- No till cropping reduces mixing of soil applied copper

Zinc deficiency is often found in heavier textured alkaline soils although can also be a problem in acidic soils if soil levels are low. Calcareous soils (where free lime is present) regularly give zinc responses hence is a common additive to cropping fertilisers in the Wimmera- Mallee and the alkaline soils in SA.

Contributing factors to zinc deficiency

- Water stress during early growth
- Root pruning from group A and group B herbicide damage
- Short days when soils are cool and wet
- Increasing pH by liming and calcareous soils
- No till cropping reduces mixing of soil applied zinc

Tissue testing the youngest emerged leaf blade (YEB) will give an accurate indication of your crop trace element status. Testing your cereal crop during early tillering will give the opportunity to correct nutrient deficiencies with foliar sprays before any significant yield loss occurs.

Soil testing is not as straight forward as critical levels in soil for copper and zinc will vary with soil texture and organic matter levels. Guidelines for estimating the required level of zinc in a DTPA soil analysis has been developed using soil pH, clay and organic matter content .

Last year as we reached mid to late August the country got very wet. This emphasised the copper and zinc deficiency. Due to water logging, plant root growth was slowed or stopped. This poor root exploration of the soil made it difficult for plants to take up enough copper and zinc to supply the upper parts of the plant. This problem was then made worse by not being able to access paddocks with boom sprays to address the matter with a foliar spray.

Clients that used copper and zinc coated high analysis cropping fertiliser didn't run into as big a deficiency issue and weren't solely reliant on trying to get a foliar spray out when paddocks were too wet.

Sowing with copper and zinc down the tube has the nutrients right underneath the plant. This promotes better plant vigour as it can be utilised right from early germination. There is also no need to worry about getting foliar sprays out when it gets wet. And by the time you can get on to spray, it may be showing deficiencies, meaning some damage (yield loss) has already occurred. Unless the deficiency is severe, crops will look normal and their deficiency will go unnoticed (unless a tissue test is done) which will lead to yield reductions (hidden hunger).

Planning is very important with trace element applications. It's a good idea to keep paddock history records e.g crop/pasture rotations, fertiliser history, and yield removal or yield maps from harvesting.

Factors for managing copper and zinc in crops

- Review soil test data for soil type, soil pH and nutrient status
- Speak to your agronomist for trace element deficiency in your area
- Review your history of applied trace elements for the crop area
- Drill cropping fertiliser with applied trace elements if needed
- Tissue test crops during early tillering for cereals or cabbaging for canola
- Apply foliar copper or zinc with herbicides or fungicides (copper) if required

ONION GRASS IN PASTURE

Sophie Leonard

Onion grass can reduce the productivity of pastures and livestock, making it a costly weed but easy to kill with a basic understanding how to managing it. Onion grass is generally indicative of poor pasture fertility and is not commonly a problem in well fertilised pastures.

- Onion grass has no nutritional benefit to animals as it remains undigested in the gut and when a large quantity is consumed, balls may form in the bowel, in some cases causing death.
- Onion grass often grows ahead of desirable species, utilising moisture and nutrients restricting production potential.
- Most onion grass seeds require a temperature of 16.5°C and above to germinate.
- The main causes of onion grass infestation are autumn bare ground and lack of competition from pasture species.
- Prevention involves managing pastures to maintain above 70 per cent ground cover and maximising growth for competition during autumn and winter with good soil fertility as onion grass does not respond to fertiliser.
- Onion grass can be controlled in established pastures using registered metsulfuron-methyl herbicide. It is important that spraying is conducted at the point that the old corm is exhausted and the new corm is developing which would be June/July or approximately six to eight weeks after onion grass has emerged. Spraying any later can get rid of flowers and seeds but not corms.
- Note that products containing metsulfuron-methyl are likely to kill clover species for the remainder of the season after spraying but with a good seed bank it should recover the following season.

GRAZING WINTER CEREALS:

Harry Armstrong

WHICH CEREALS?

All winter cereals can be grazed. Early sown cereals (usually oats) will obviously provide a relatively longer period of grazing compared to later sown crops or spring wheat varieties.

WHEN TO GRAZE?

Cereals can be grazed when the plants can no longer be pulled out easily and have grown secondary roots.

WHEN TO STOP?

Grazing should cease before the cereal reaches growth stage 30, which is just prior to stem elongation. Crops can be grazed quite heavily without causing major yield penalties, provided good spring rainfall occurs. Grazing can delay flowering by up to 10 days. It is important to graze paddocks evenly so that the crop flowers evenly. You should aim to graze cereals down to approximately 300kg/ha within 10-14 days. Crops can be grazed again later as long as stem elongation phase has not been reached.

UREA?

An application of urea post grazing is recommended due to the removal of protein in the grazing period.

Contact the professional team at Vickery Bros.

For healthy soils.

Agronomy Team

James Stewart	0427 752 773	Sophie Leonard	0409 868 132
Harry Armstrong	0417 052 095	Rebecca Stewart	0427 337 253
Leighton Rees	0437 752 707	Bruce Lewis	0422 632 730

Depots

Coleraine 03 5575 2777 Heywood 03 5527 1777 Edenhope 03 5585 1975

Mount Gambier 0408 646 220 Frances 0418 330 267 Casterton 03 5575 2777

SEASONAL REMINDERS

- ☐ Organise your deep nitrogen testing now
- ☐ Check for slugs on newly sown pastures and crops

If undeliverable return to:
Vickery Bros. Pty. Ltd.
105 Whyte Street
Coleraine VIC 3315

POSTAGE
PAID
AUSTRALIA