Winter 2016

Fertilizer News

Make the best nitrogen decisions

Good summer and autumn rains and early sowing in the majority of areas across the wheatbelt have brought with them the potential for higher crop yields. A longer growing season and the potential for grain to fill during the cooler months present a great opportunity. Growers who were favoured by and taken advantage of these conditions by sowing canola and wheat early need to make sure they don't miss out on extra yield because of sub-optimal crop nutrition.

Nitrogen is the most important element for plant growth and is usually taken up by crops and pastures in the largest quantities of any nutrient.

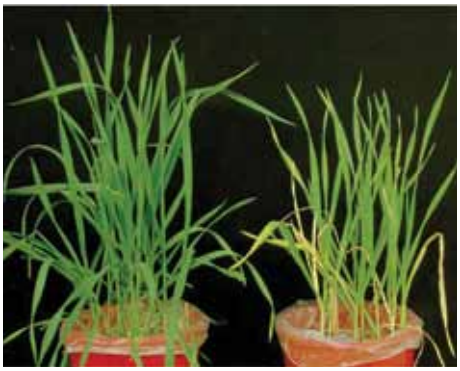
If the season continues to provide good moisture and support growth, additional nitrogen can be highly profitable. Therefore, farmers across the state will need to make important decisions on matching the nitrogen inputs on crops to their yield potential.

Yield potential is not the same as expected yield or average yield, but is the maximum yield that could be achieved from a given seasonal rainfall – given unlimited nutrition or no soil constraints like subsoil pH or hard pans that can limit root growth. Some of the factors that impact on yield potential are paddock history and crop rotation, weed numbers, soil type, soil nutrient status, crop variety and sowing time, fertiliser application, rainfall and available stored soil moisture. Yield Prophet is one tool that can be used to determine the yield potential of a crop throughout the season.

Summer rainfall will have led to some mineralisation of nitrogen from inorganic and organic matter in the soil, and this has led to higher nitrate and ammonium levels in soil tests in some areas in the state. The level of mineralisation is dependent on soil organic carbon (OC) levels with higher soil OC levels potentially providing more mineralised nitrogen. This nitrogen is available to the emerging crop if it has not been leached down the profile by autumn rain.

In some cases where a lot of wheat stubble has been retained or turned into the soil, nitrogen levels may be depleted as the soil microbes breaking down the stubble will utilise nitrogen from the soil reserves to consume the wheat stubble.

In this issue!



Hidden hunger?

Nutrient deficiency symptoms usually become evident when a deficiency is reasonably severe. Fifteen to 30 per cent yield loss often occurs in cereals without seeing any deficiency.

In a 2.0 t/ha crop that could lead to potential losses in excess of half a tonne/ha.

This 'hidden hunger' can however be identified with Summit plant analysis. When carried out early, there's usually enough time for remedial action to be taken through application of fertilizer or foliar spraying of trace elements.

Summit plant analysis

- ☑ ***Independent laboratory***
- ☑ ***Rapid turnaround times***
- ☑ ***Wide range of nutrients measured***

Make the best nitrogen decisions (cont.)

Early nitrogen has a big influence on setting up crop potential yield as it is required to maximise tiller and spikelet number. These numbers are set by the time the plants are six weeks old - this does depend to some extent on the maturity of the wheat or barley variety. Hopefully sufficient nitrogen has been applied at seeding or shortly after to ensure good tiller number. For canola, yield potential is set during elongation and budding, therefore nitrogen is required before elongation.

In years without summer rain mineralisation normally occurs in autumn but predominantly in spring when moisture is available and soil temperatures are higher. This nitrogen is normally responsible for finishing the crop and has a big impact on grain weight and protein content.

If your paddock has low levels of soil organic carbon you may not have additional nitrogen from mineralisation available in the spring, therefore you may need to apply additional nitrogen later in the season. Plant analysis will indicate if nitrogen is limiting in your crop.

How much nitrogen is required is determined by potential yield. In cereals, about 30 kg of N is required in the plant to grow each tonne of grain. About 20 kg of N moves to the grain and is removed at harvest and about 10 kg N remains behind in the straw.

No nitrogen fertilizer application will be 100 percent efficient, all incur some losses. Typically 40 kg of N needs to be applied to grow each tonne of cereal grain and maintain soil fertility.

Therefore nitrogen will need to come from soil nitrogen reserves from mineralisation or it will need to be applied to the crop. A nitrogen budget based on soil test and plant test results will assist in determining the nitrogen to be applied to help the crop reach its yield potential.

When budgeting nitrogen for canola, about 55 kg N is needed to produce a tonne of grain, with 40 kg of N ending up in the grain and about 15 kg of N remaining in the stubble. Therefore 70 to 80 kg of N is needed to grow each tonne of canola seed. Canola also has a higher demand for sulphur, so a product containing nitrogen and sulphur should be considered when applying post emergent nitrogen.

Summit N-Gauges and plant analysis can play an important role in determining if nitrogen is limiting your crop.

Plant analysis will also show whether any other nutrients like sulphur, potassium, zinc or copper are limited in supply and could therefore hold back the crop and decrease yield potential.

What nitrogen source suits you?

There are a number of products available to growers when applying post-emergent nitrogen. The product of choice will be determined by which nutrients you need to apply and whether your application systems are set up for granular or liquid products.

If nitrogen is the only nutrient required then urea or UAN are the products to use. Urea is the cheapest form of nitrogen.

There may be some savings in applying UAN in conjunction with a herbicide or fungicide, however the risk of crop scorch increases, particularly at rates above 50 L/ha.

Streaming nozzles lower the risk of leaf scorch but take away the chance of applying UAN and a chemical in the one pass.

If nitrogen and sulphur are required then granular options like UreaPlus or NitroPlus would be the products of choice. MAXamFLO provides nitrogen and sulphur in a liquid form and is very competitively priced.

If nitrogen, sulphur and potassium are required post-emergent, then a NKS product will provide all these nutrients in the one product.

If you want to know how much urea, UAN or MaxamFlo is required to apply a required amount of nitrogen the table above provides a guide, or the Summit Fertilizers Nitrogen Calculator iphone app can provide the answer in seconds.

	Urea	UAN	MAXamFLO	UreaPlus
N Rate (kg/ha)	kg/ha	L/ha	L/ha	kg/ha
10	22	24	36	27
20	43	47	72	54
30	65	71	108	81
40	87	95	144	108

MAXamFLO provides approximately 1kg sulphur for each 13 litres applied
UreaPlus provides approximately 1kg sulphur for each 12 kilograms applied

2016 field trials update

Summit Fertilizers continues to invest in field research resulting in the 2016 trial program being the largest to date. Summit has established 38 trials across the state reaching all corners of the south west growing region from Binnu to Albany to Esperance to Bonnie Rock.

A large proportion of the trials are in conjunction with grower groups including Northern Agri Group, West Midlands, Mingenew Irwin, Facey, Corrigin FIG, SEPWA (Esperance), Merredin FIG and FEAR Group (Moorine Rock). This allows growers to view these trials at field days and receive results through grower group material and at autumn updates.

Summit continues to investigate nutrient relationships in a range of crops and under different soil and climatic conditions. Trials are replicated to allow for sound statistical analysis and many are repeated across a range of locations and seasons to determine optimal practice for an array of environments.

Key areas of investigation in 2016 include:

- phosphorus and nitrogen interactions in wheat and oats
- phosphorus responses in wheat and barley on low and high PBI soils

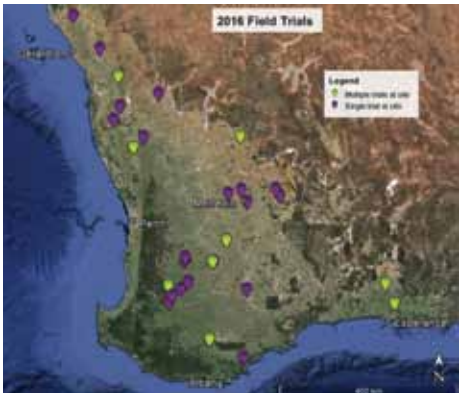
Dr Mark Gherardi
Field Research Manager

- phosphorus responses in wheat after lime and gypsum applications
- potassium sources, placement and timing in wheat, barley and oats
- nitrogen timing in canola
- tactical nitrogen with N Gauges in wheat, barley and oats

Sufficient potassium and phosphorus nutrition is very important in promoting early growth and ensuring the crop is able to utilise nitrogen efficiently. This year's research continues to demonstrate the improvements of sustained upfront phosphorus and looks to refine optimal potassium application under different conditions. Potassium field work also showcases Summit Fertilizers' new MOP based granulated compound fertilizer Vigour® against other potassium products and methods of application.

2015 trial data built confidence in Summit N Gauges and the In-Season Nitrogen Calculator as a decision support tool to guide nitrogen top-ups.

The 2016 program looks to further validate the nitrogen calculator recommendations with nine trials established across varying soil types, rainfall zones and cereal crops.



SUMMIT FUEL GAUGES

Fuel Gauges

Strip trials are not new in agriculture. Summit Area Managers have been applying Fuel Gauges across paddocks for years. But there is still some confusion about what information we can expect from them. The science has come a long way from the simple visual response to plant test only version of strip trials.

Plant tests are a snapshot in time and can't predict rates of nitrogen (N) to give best return. They are very handy if done as paired samples with a Nitrogen Fuel Gauge (N-Gauge) to examine other nutrients. For instance, the application of nitrogen onto a crop with marginal copper or manganese levels can lead to greater crop demand that can't be met by the soil.

So you may have to reduce the amount of N applied or consider a foliar trace element spray also. Deficiencies of potassium or phosphorus can be harder to handle in-crop.

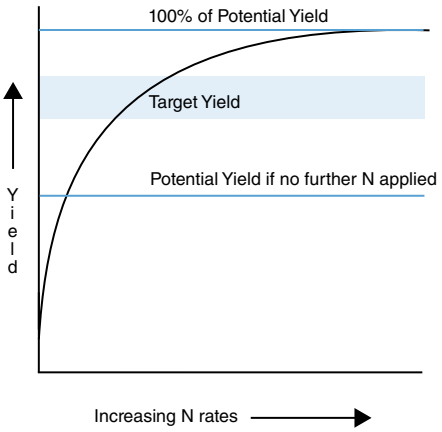
A visual response to fertilizer usually corresponds to a 15 per cent or more yield response. However NDVI (GreenSeeker®) readings can pick responses below the visual spectrum which enables profitable applications of fertilizer above that already applied.

Conversely, the readings may inform you that your nutrient status is adequate and further applications are not profitable. Both sets of data are of great benefit to the grower.

Recent research carried out by the Summit field research team has verified the calibrations of the Summit N Calculator. Further field trials are in the ground in 2016.

An N-Gauge is laid down immediately after sowing. Summit Area Managers generally use Summit UAN or MAXamFLO at a rate of around 200 L/ha.

- A high rate is used to get the crop to 100 per cent of it's potential biomass and is used on top of the farmer's practice.
- Target yield is around 85 to 95 per cent of the potential - dependant on the price of the grain.
- A GreenSeeker® is used to assess crop growth both on and off the strip.
- By using the Summit N Calculator, Area Managers can assess the potential yield and protein benefits from applying extra nitrogen at a calculated rate to achieve the 80 to 95 per cent potential yield.



A good year for oats

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Historically, oats has been the 'poor cousin' to other crops due to low grain prices but, with a changing end market and rising prices, there has been a change of attitude in relation to nutrition for this crop.

Early sowing opportunities across many oat growing regions this season has resulted in some very early crop establishment. Canopies are much larger than would be usual at this time of year and this poses some questions on nitrogen (N) management.

For most growers the first N application has already been made to oat crops. A top-up may be necessary depending on the end use and what was applied early.

In the higher rainfall zones it is likely that a higher N rate was applied six to eight weeks after sowing and coupled with excellent growing conditions, many oat crops now have a large number of tillers.

Providing soil moisture levels are adequate, a small top-up may be necessary to ensure those later tillers survive and are productive. This will be more important with oaten hay crops because it has a direct correlation with biomass and there is no need for consideration of grain quality.

Tissue testing is a useful tool and N-Gauge nutrient strips will also play an important role in refining in-season decisions. Hay crops should have higher total N (20 to 50 per cent depending on location) than grain crops with a larger portion of this applied early. Total N and timing will largely be dependent on location, moisture status and risk profile, along with variety and time of sowing.

Williams has become a very popular high yielding oat variety, although in the past many growers have faced screenings and weight issues, especially with the tight finish experienced last year.

Therefore, N management will become more of a focus with Williams as a balance between yield and grain quality is sought.

Some growers are exploring the use of growth regulators applied at stem elongation in the hope of being able to confidently apply more N to target optimum yield, without compromising weight and screenings and causing the crop to lodge.

The variety Bannister has also become popular and growers are more confidently applying N to meet target yield and achieve Oat 1 segregation and as a result it requires less N management.

If the higher prices sustain themselves, earlier sowing of oats and higher N rates may become more common.

Different seasons, varieties, locations and end uses are going to require different approaches and it is important to speak to your Summit Area Manager about utilising all of the available tools to maximise the grain or hay yield in your oats.

Summit plant analysis – ensure your crop potential isn't limited

Most areas across the Wheatbelt had an early break to the season and have also received follow up rain. These crops now have high yield potential, so monitoring crop nutrient status is important to ensure this potential is met. The best way to monitor this year's crop to ensure nutrient supply does not limit yield potential is to use plant analysis. Plant analysis backs up soil testing and complements it in many ways.

Plant analysis can determine if your fertilizer program has been adequate for the crop or if it needs fine tuning. And the very best time to sample is when the crop is growing vigorously, with no obvious deficiency symptoms. When these conditions prevail, the crop is putting maximum pressure on nutrient supply.

Plant analysis at this time may well pick up hidden nutrient deficiency or nutrient supply that is not yet critical, but may be so in the near future. If this is the case actions can be taken to ensure the impact of this deficiency is minimised.

Once deficiency symptoms are visible, reductions in yield potential of 30 per cent or more may already have occurred and the application of additional nutrients may do little to regain the loss. Nutrients that are required early in the plants' life, such as phosphorus, manganese or zinc fall into this category. Other nutrients like nitrogen, sulphur and copper can be effectively applied later if early supplies were inadequate.

Plant analysis can be used as a monitoring tool to ensure nutrient levels are adequate, or as a diagnostic tool to explain variations in crop growth.

If used for monitoring purposes, results are compared to standards derived from plant nutrition trials over time.

When used to diagnose whether nutrition is a factor in differences in crop growth, comparative samples should be taken from good and poor growth areas of the paddock.

If you have N-Gauges and other nutrient rich strips, plant sampling on and off the trial strip can assist in providing recommendations and identify secondary limiting nutrients.

It is important to note that the appearance and measurement of nutrient deficiency in plant foliage gives no information about why these deficiencies occur. This is where soil analysis will help complete the plant nutrition picture and provide a basis for appropriate management options.

Plant sampling

Like soil sampling, plant analysis requires good, random sampling techniques to generate accurate results.

Summit Fertilizers recommend whole tops for sampling cereals, canola and lupins. To accurately assess a whole top sample we need to know the age and average weight of the plants sampled, so please ensure seeding date and number of plants sampled are provided.

Pastures can be sampled by plucking foliage similar to stock grazing, so you are sampling young leaves and petioles from the top of the sward. Important things to remember when plant sampling are:

Do

- ☑ Fill out the Paddock Information Form as completely and accurately as possible. The more complete the information the more reliable the interpretation.
- ☑ Always record the sowing and sampling date and, if possible, emergence date. These are very important to accurately identify the plant age and growth stage.
- ☑ Indicate if fertilizers or other sprays have been recently applied. Identify them and record their application rates in the Paddock Information Form.
- ☑ Wear clean nitrile gloves and avoid touching anything between putting on gloves and taking the sample.
- ☑ Collect a representative sample. Sample the field as you would if you were sampling the soil (10 to 20 sampling points). Take separate samples to compare between good and poor areas.
- ☑ Cut stems at 1cm above ground level with stainless steel cutting blades and discard the below-ground portion.
- ☑ Always collect sufficient plant material. Take as many plants as possible so you get a representative sample. This may be 80 plants if sampling at three weeks or 10 plants if early booting stage. A beer can sized bunch is a good guide.
- ☑ Take paired samples if windrows are showing up in crops.
- ☑ Take samples across time as well – e.g. five weeks, eight weeks, 12 weeks – to monitor changes in nutrient uptake.
- ☑ Always collect a soil sample from problem areas.
- ☑ Keep samples cool and dry.
- ☑ Dispatch them to the laboratory as soon as possible, avoiding post across the weekend if you can.
- ☑ When in doubt, call or e-mail Summit Fertilizers. Your local Area Manager is a good starting point.

Don't

- ☒ Sample dead plants.
- ☒ Wash leaf tissue.
- ☒ Collect or ship samples in plastic bags or containers.
- ☒ Use galvanised equipment in any way.
- ☒ Sample severely insect damaged plants.
- ☒ Sample plants that have suffered severe mechanical injury.
- ☒ Sample plants that are too old (see instructions).
- ☒ Sample during severe drought.
- ☒ Include roots, branches or loose soil with any plant sample. (A soft brush can be used to remove soil particles.)
- ☒ Post the samples without including the Paddock Information Forms.

Strategic use of nitrogen on pastures

Pastures are the cheapest feed source and applying nitrogen fertilizer to grassy pastures can dramatically boost pasture growth and quality. Nitrogen also increases metabolisable energy and crude protein content in pasture and also decreases pasture neutral detergent fibre (NDF) content.

There can be a dramatic increase in production to applied N if there are no other constraints to plant growth and the nitrogen is able to enter into desired pasture plants.

The size of the response will depend largely on soil moisture, density and composition of pasture species, availability (or unavailability) of other nutrients and soil temperature.

Key points

- Results from Summit pasture trials reveal 1kg N/ha in responsive situations can conservatively grow an additional 15kg dry matter/ha during winter.
- In such a situation, 30kg N/ha would produce an additional 450kg dry matter/ha.
- 75L UAN or 65kg urea supplies 30kg N and costs about $40 and $26 respectively.
- The cost of an extra tonne of paddock grown feed in this conservative scenario would be about $90/t for UAN, and $60/t for urea.

Summit continues to support annual field days

Summit Fertilizers has a long history when it comes to supporting the three major machinery field days held annually in Western Australia.

Our ongoing support of the Mingenew, Dowerin and Newdegate field days is a direct reflection of Summit's commitment and support for these communities and the wider Agricultural industry in WA.

The field days enable service providers and suppliers in the industry to demonstrate their ongoing commitment via new innovative ideas, products and technology, all the areas in which Summit continues to deliver to the market and our customers.

This year's field days will be:

- Mingenew: Thursday and Friday, August 10th and 11th.
- Dowerin: Wednesday and Thursday, August 24th and 25th.
- Newdegate: Wednesday and Thursday, September 7th and 8th.

Once again Summit will be strongly represented at the field days by our Area Managers and personnel from senior management, operations and finance.

This is a fantastic opportunity for growers to have access to staff from all of our departments and to get information on a face-to-face basis in a relaxed environment.

We look forward to seeing you at the field days where we will have available our 2016/17 market offer.

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