

Topdress tactics and tools



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With topdressing now under way in many cereal and canola crops, it is timely to revisit the nitrogen topdressing decision tools and fundamentals so that what is left of the season can be managed effectively.

It starts with nitrogen budgeting. Knowing the crop's nitrogen demand is essential to determine how much nitrogen to supply.

Crop nitrogen removal = (Yield x Protein x 1.75)

Crop nitrogen demand = (Yield x Protein x 1.75) x Efficiency factor of 2.2

The efficiency factor of 2.2 represents 45% nitrogen use efficiency.

Nitrogen use efficiency can vary depending on crop type, crop health, crop growth stage and seasonal conditions. For example, barley generally has a higher nitrogen use efficiency of 50-55% (1.8 to 2), while canola has a lower nitrogen use efficiency of 35% (2.9).

For barley and canola, convert grain protein to total nitrogen using a conversion factor of 1.6.

As the season progresses, it may be necessary to adjust nitrogen budgets to take into account higher or lower rainfall than expected.

Yield potentials can be calculated with the following equation:

Soil plant available water + Growing season rainfall - Evaporation (~110 mm) x Estimated water use efficiency.

Table 1: Estimated water use efficiency in various crops, southern Australia

| Crop | Water use efficiency |
|--------|----------------------|
| Wheat | 20 kg/mm |
| Barley | 18 kg/mm |
| Oats | 22 kg/mm |
| Canola | 12 kg/mm |

Source: French and Schultz, 1984, Australian Journal of Agricultural Research.
Note: In northern cropping zones, discuss target WUE with your agronomist.

These calculations are helpful in determining the total amount of nitrogen needed, but you will also need to know how much nitrogen is available.

Estimating existing nitrogen supply

There are a number of tools available to advisers to aid in determining available crop nitrogen, such as reviewing paddock histories, deep soil nitrogen testing, total nitrogen testing and measuring shoot densities.

The best decisions are made based on solid information collected from a range of sources.

- Paddock history

Information such as previous crop yield, previous grain protein levels, crop rotation, fallow weed control, soil moisture levels, seasonal conditions and expectations can all help guide topdressing decisions.

For example, where paddocks produced wheat crops in 2016 with less than 10.5 to 11% protein, it suggests nitrogen supply was limiting. There may be higher nitrogen levels in 2017 after a legume pasture or pulse crop phase in 2016.

Relying solely on paddock history information can be misleading at times, as no direct measurements are taken.

- Deep soil nitrogen tests

Pre-plant deep soil nitrogen test results are an excellent resource for nitrogen management.

Sampling in-crop can also play a role where deep N testing hasn't occurred pre-plant.

When sampling post planting, be careful to avoid any banded pre-plant nitrogen or starter nitrogen fertilisers.

In-crop deep nitrogen test results should be used in conjunction with the percentage of total nitrogen in above ground dry matter, especially where dry matter is above 1000 kg/ha, to calculate the total available nitrogen.



Timing considerations

Nitrogen applications before GS30 can increase tiller numbers and dry matter, leading to yield increases.

Nitrogen applications after GS30 can improve tiller survival and maintain yields. Some carry-over of nitrogen into grain protein may occur.

When nitrogen is applied after GS59, it is generally to manipulate grain protein and maintain yields in above average seasons.

Remember that it is only when the yield potential has been reached that additional nitrogen can contribute to higher grain protein levels.

If maximum yield has not been achieved, nitrogen applied at this stage may increase yield and reduce protein under excellent seasonal conditions.

Nitrogen use efficiency is reduced at this late application timing. Soil moisture, seasonal conditions and likely returns need to be assessed carefully as part of the topdress decision process.

Product choices

While urea is the most commonly used nitrogen fertiliser for topdressing, advisers can also recommend fertilisers such as Green Urea NV[®], GranAm[®] or EASY N[®].



Green Urea NV contains a urease inhibitor that will help protect against volatilisation losses for up to 14 days.

During this time, the formation of unstable ammonia gas is delayed, allowing more time for rain to arrive and safely incorporate the fertiliser into the soil, where it can be used by the crop.

At 46% nitrogen, Green Urea NV offers the same high analysis as granular urea.



GranAm supplies nitrogen with plant available sulphate sulphur in a superior granule that is easy to handle and spread. It should be applied before rainfall (>10 mm) to maximise the potential for plant uptake.

GranAm is ideal for canola, where sulphur is limiting.



EASY N is a highly concentrated form of nitrogen in solution. Many growers like having EASY N on farm so they can go out with the boomspray and apply liquid nitrogen any time that significant rainfall is imminent.

EASY N contains 42.5% nitrogen (w/v) in the urea, ammonium and nitrate forms. This makes it less susceptible to volatilisation than urea and better able to provide quick responses in crop, even under cold conditions.

For more information, feel free to contact me on 0427 006 047 or jim.laycock@incitecpivot.com.au.



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