

Reducing nitrogen losses in summer crops

Keep nitrogen where the plant needs it in your summer crops for increased production.

When establishing a fertiliser management program this summer, consider using an ammonium stabiliser. eNpower® is designed to reduce leaching, denitrification – including nitrous oxide emissions (N₂O) – and have the potential to improve yields.

Ammonium stabilisers are ideal in summer crops which have high nitrogen demands and especially where irrigation or heavy rain events occur. Understanding N loss pathways provides insights on best management practices, reduce losses, and allows for consideration around product selection.

Nitrate-nitrogen is easily moved with the flow of water and is therefore lost through leaching and runoff. These losses are greatest on light sandy soils where over irrigation or large rainfall events can move the nitrate N past the root zone. If moisture movement is below the plants root system, the highly mobile nitrate N will be a passenger and lost to the crop.

In waterlogged soils the N is lost through denitrification. This occurs under waterlogged, anaerobic soil conditions - especially where microbial activity is high. This is largely associated with warmer soils and a carbon source.

An ammonium stabiliser keeps the nitrogen where it is needed. eNpower keeps nitrogen in the stable ammonium form for approximately six to twelve weeks. It slows the conversion rate of ammonium to nitrate, potentially preventing nitrogen losses from occurring and resulting in possible improved yields.

With potentially more N available for longer, there may be an opportunity for operational savings by increasing pre or at sowing rates and reducing the requirement for in-crop application.

CORRECT APPLICATION IS ESSENTIAL

Products treated with eNpower need to be applied to the subsoil. When fertiliser is ripped into the soil, it is necessary to 'close it over' to prevent ammonia gas loss from these rip lines. To avoid the risk of ammonia toxicity to the seed or seedling, placement should be to the side of the seed and buried under 10 cm of compacted soil cover. This prevents volatilization or runoff should irrigation be applied, or a rain event occur.

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EVIDENCE OF EFFECTIVE AMMONIUM STABILISATION

A GRDC funded study, conducted at University of Queensland Gatton Campus research station, Qld, found that 100 and 150 kgN/ha rates of DMP (3,4 dimethylpyrazole phosphate) treated urea maintained higher profile nitrogen concentrations compared to conventional urea, for over 71 days (Figure 1). This trial was located on a heavy black vertosol soil and conducted under hot, wet summer conditions.

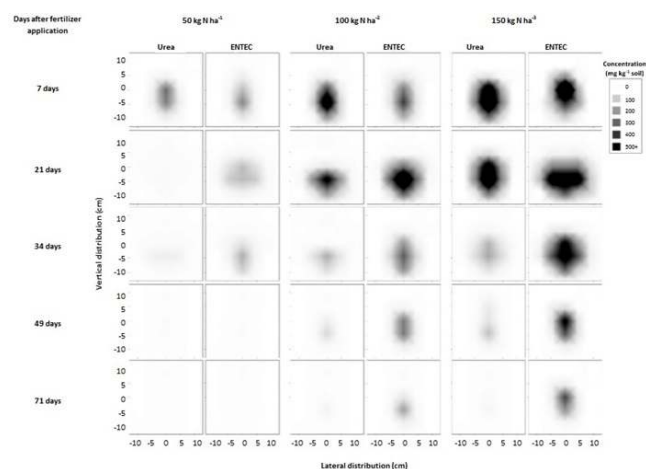


Figure 1. Concentration and distribution of profile ammonium-N over time, on a Vertosol soil, from conventional urea and DMP urea applied at 50, 100, 150 kgN/ha. Source: Janke 2020.

Boost spring feed with strategic nitrogen applications

The trial revealed that when using DMP the profile nitrogen levels (i.e. nitrate plus ammonium) were just under 100% but mostly 200% higher compared to using standard urea over the 34, 49 & 71 days sample periods. Over the same timeframes, the soil ammonium level ranged from just either side of 300% but finally up to 10-fold better compared to standard urea.

This is strong evidence that DMP stabilises more nitrogen in the soil for longer. This is achieved by reducing losses and making greater amounts of nitrogen available to the crop, especially throughout the critical weeks of greatest N demand.

Additionally, consider crop type, climate, production systems, soil type, irrigation and rainfall all influence nitrogen management and importantly, so does nitrogen product selection. eNpower is effective option to reduce N loss pathways and to also get more nitrogen into the crop. This is where and how effective nitrogen management provides its greatest benefit.

For a more complete picture of the nutrients available to your crop, arrange a soil test through utilising the Nutrient Advantage® laboratory.

To take advantage of the benefits an ammonium stabiliser on urea and ammonium-based fertilisers provides, simply request eNpower treated products be included in your next Incitec Pivot Fertilisers blend.

REFERENCES

Janke, C., Moody, P., Fujinuma, R. and Bell, M. (4 March 2020). Can 'stabilised' and controlled-release N deliver improved N use efficiency when applied in concentrated bands? Grains Research and Development Corporation (GRDC). <https://bit.ly/3ILAOP7>.

FURTHER INFORMATION

For more information or advice on ammonium stabilisers, feel free to contact me on 0412 565 176 or lee.menhenett@incitecpivot.com.au.

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