

No 27 September 2005

Slow release nitrogen fertilisers

Background

The efficiency of nitrogen use in WA is often poor, especially in wet conditions on sandy soils where nitrogen is leached out of the rooting zone.

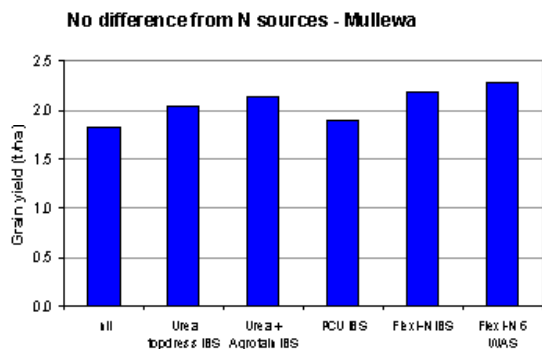
Nitrogen applied in the urea form must be converted into nitrate before the plant can take-up the nitrogen. Nitrate is also the form that is prone to leaching.

Several slow release nitrogen fertilisers have been evaluated over the past decade. These include plastic or polymer coated urea (PCU) and urea treated with the urease inhibitor Agrotain®, which both slow down the conversion of urea into nitrate. These products also have the potential to reduce seedling toxicity when drilled close to the seed.

Key Results

CSBP conducted four wheat trials in 1998 comparing urea treated with Agrotain® and PCU with other nitrogen sources all topdressed before sowing. In 1999 another two wheat trials were conducted with PCU and urea at three nitrogen rates using various placement treatments.

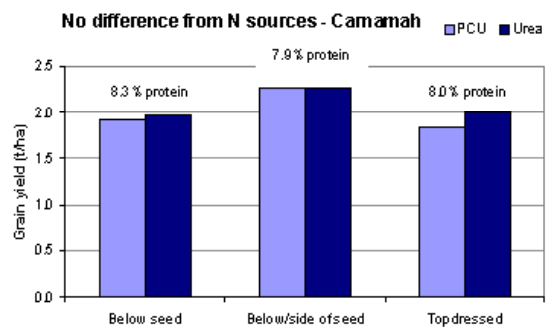
In the majority of cases, these products performed similarly to urea in terms of plant growth, grain yield and protein. An exception was east of Mullewa in 1998 where urea treated with Agrotain® produced five per cent greater yield than standard urea, while PCU produced six per cent less yield than urea (see graph below). In the same trial Flexi-N topdressed before sowing also produced eight per cent more yield than urea, while Flexi-N applied six weeks after sowing produced 12 per cent more yield than urea.



IBS - Incorporated by seeding, PCU - Plastic coated urea, WAS - Weeks after seeding, % - Grain protein %

At Carnamah in 1999 PCU was slightly less toxic than urea when banded below the seed or banded below and to the side of the seed, but produced similar grain yield at the end of the season (see graph below). When topdressed before sowing, PCU produced nine per cent less yield.

The WA No-Till Farmer Association also conducted several trials during 1998-2000 with PCU and urea treated with Agrotain® and found no consistent benefit for wheat or canola.



Summary

Trials results with PCU and urea treated with Agrotain® have been inconsistent, but in the majority of cases these products performed similarly to standard urea and Flexi-N.

Given the greater cost of the slow release forms of nitrogen without any other logistical benefits, these are generally less profitable than other nitrogen sources.

Crop growth and profits are typically maximised by the tactical applications of a readily available form of nitrogen (such as Flexi-N) at several times during the season rather than relying on one application at sowing. With this approach growers can save on the costs of nitrogen in below average seasons, and exploit the potential of above average seasons.