

Research alliance investigates proper blending of enhanced efficiency fertilisers

Smart blending of enhanced efficiency fertilisers (EEFs) to maximise sugarcane profitability is one of ten research projects into nitrogen use efficiency (NUE) being conducted under the umbrella of the More Profit from Nitrogen Program - a cross sector collaboration between sugar, horticulture, dairy and cotton. **By Marguerite White.**

This project, run by the Department of Science, Information Technology, and Innovation (DSITI), with partner organisations, is investigating optimal blending ratios of EEFs, such as polymer-coated urea (PCU), with conventional urea, under various soil and seasonal conditions in six Queensland sugarcane growing regions.

Research leader, Dr Weijin Wang explains: "Nitrogen release patterns of urea or PCUs alone may not match crop nitrogen uptake dynamics and the high cost of EEFs can impede their use by farmers. The research is investigating potential to manipulate nitrogen release patterns by blending these products to better match plant demands. A nitrification inhibitor coated product is also included in the study for comparison. The economic advantages may be substantially reduced nitrogen inputs using precision application techniques and cheaper blended products rather than applying expensive single EEFs."

Across the research sites at Innisfail, Tully, Ingham, Mackay and Bundaberg, the project is analysing the nitrogen dynamics within the plant root zone to 1.2 metres and in plant biomass throughout stages of plant growth.

At-depth soil sampling is being conducted to better understand how EEF products can also have a beneficial effect in preventing nitrogen leaching loss, especially when the nitrogen source is exposed to loss events such as high rainfall.

Herbert Cane Productivity Services Ltd (HCPSL) is one of four research partners in the DSITI project engaged to manage the ground level research on commercial properties. They are responsible for trials at Cordelia and Lannercost.

"These sites are good examples of varying soil and seasonal conditions being explored by the project,"

explains Adam Royle, HCPSL Extension Agronomist. "The Cordelia site is a heavy clay soil and productivity can be highly variable due to wetter conditions and potential flooding. Lannercost is on a lighter textured soil and productivity is fairly average for the district, although it can be susceptible to dryer than average conditions."

Soil samplings of the study plots, established with varying PCU/urea ratio blends at rates below and in accordance with the SIX EASY STEPS guidelines are conducted pre fertilisation, at a number of points post fertilisation and post-harvest to analyse nitrogen levels and potential nitrogen movement in soil.

Biomass sampling is taken to gauge growth and nitrogen uptake in the fertiliser blend and rate trials. Yield and CCS sampling will be conducted by HCPSL and results will be sent to DSITI for further statistical analysis.

To date, soil sampling results have highlighted the following messages for growers:

- About four months after application of conventional urea, little fertiliser nitrogen could be detected in the top 120cm of soil, indicating that a considerable portion of the fertiliser could have been lost apart from those taken up by the crops.
- The nitrification inhibitor DMPP-coated urea significantly slowed down conversion of ammonium to nitrate at least in the first month after fertiliser application. This should help reduce nitrogen losses from leaching or as gases.
- Higher mineral nitrogen levels were found in the soils applied with PCU several months after fertilisation. This means that the PCU product could hold fertiliser nitrogen for a much longer time than conventional urea as expected.

“The trials will help fine-tune the nitrogen fertiliser management practices and provide better understanding of the full benefits to growers,” Mr Royle said.

Dr Weijin Wang summarises: “Optimum product blending ratios to balance sugar yield, NUE and profitability are being investigated to develop a support tool that will assist growers in product selection and quantitative decisions. The results will contribute to efficient and effective nitrogen fertiliser management strategies for the sugarcane industry with potential outcomes being considerably lower fertiliser N inputs, lower nitrogen exports to waterways and enhanced farming profitability.”

More on the More Profit from Nitrogen Project can be found at <http://www.crdc.com.au/more-profit-nitrogen>



Australian Government
Department of Agriculture
and Water Resources

This project is supported by funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit program, the Queensland Government's DSITI, DEHP and DAF, Sugar Research Australia, Herbert Cane Productivity Services Limited, T.R.A.P Services and Farmacist Pty Ltd, together with support from ICL Specialty Fertilisers and Incitec Pivot.

Below: Applying the field trials.

Opposite: HCSPL staff on site at one of the Herbert trial sites.

