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# Controlled release fertilisers under the microscope

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# Controlled release fertilisers under the microscope

*New research being undertaken by CSIRO is putting controlled release fertilisers, and their potential role in the Australian sugarcane industry, under the microscope.*

## Project details

### Key Focus Area: 2

**Soil health and nutrient management**

### Project name

Role of controlled release fertiliser in Australian sugarcane systems

### Project number

2014/011

### Principal provider

CSIRO

### Project end date

July 2017

The SRA-funded research, which commenced in 2014, is hoping to answer industry's questions about how, when and where controlled release nitrogen fertilisers are likely to offer benefits.

CSIRO researcher Kirsten Verburg said that unlike regular fertilisers which start releasing nutrients as soon as they are applied, controlled release fertilisers take longer to release nutrients. This may reduce the risk of nitrogen losses. The key however is being able to match the release of nitrogen to the needs of the crop.

"Controlled release fertilisers have been around for a while, but interest in the sugar industry waned after a few trials conducted in the early 1990s showed limited yield benefits," Kirsten said.

This suggested at the time that controlled release fertilisers were probably not an economically viable option in sugarcane farming systems.

With the recent focus on environmental sustainability and new products on the fertiliser market, there is a renewed interest in how controlled release fertilisers can be effectively used.

"Through our research we are trying to work out how, when and where controlled release fertilisers will reduce nitrogen losses and optimise the productivity achieved per unit of fertiliser applied," Kirsten said.

"There are a lot of questions about their application in different climates, soils and farm management systems. To conduct successful and cost-effective adoption and field trials, growers need to better understand the relationship between the nitrogen release patterns of these fertilisers and crop uptake as well as the timing and causes of nitrogen losses.

“At this early stage of the three-year project we are looking at a number of parts of the puzzle.

“We are interested in understanding more about when nutrients are released from the fertiliser. We need to understand how the timing of the release changes in different soil types, or at different temperatures. We need to understand if the release patterns are the same in different product types, and if products will perform the same way in the same location each year.

“We are also developing a better understanding of the timing of sugarcane crop nitrogen demand and nitrogen losses and how this links to geographic location and soil type.

“This will help us determine the likelihood of losses between fertiliser application and uptake by the crop.

“Once we have the answers to some of these questions we will be in a better position to match the release patterns of various fertilisers to the uptake pattern of the crop.

“In a perfect world, if you could match the release and uptake of nitrogen there would be minimal losses. While that may not be a realistic goal, we do hope that this project will provide the sugar cane industry with a better understanding of why a particular product would work in a given location before they decide to use or trial it,” Kirsten said.

Computer modelling and laboratory experiments are helping to answer some of the questions and the team is working closely with trials currently underway in the Herbert and Johnstone catchments as part of the Paddock to Reef program.

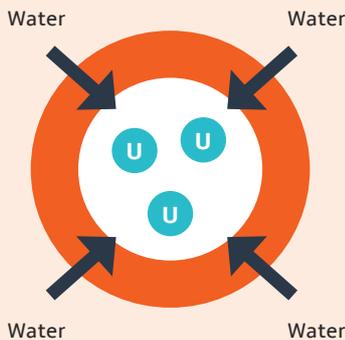
This research will also help to set out what an ideal product would look like for the sugar industry and may eventually help to lay the groundwork for a new generation of controlled release fertilisers that will more reliably reduce nutrient losses without affecting crop yield.

## How controlled release fertilisers work

*There are a range of commercially available controlled release fertilisers, most of which rely on a coating to slow release. While the composition of fertiliser coatings varies, many follow a similar process for releasing nutrients.*

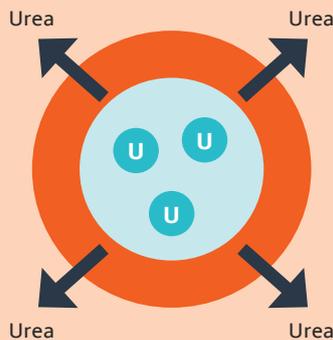
1

Water enters the granule's coating.



2

Urea (or other fertiliser) dissolves and starts to release. The rate of release typically depends on temperature, but other factors may play a role.



3

Release becomes slower as the store of internal fertiliser is depleted.

