

Smarter Fertilisers, Healthier Waterways

Qld DPI partners with MRCCC on an Exciting New Project

Queensland's Department of Primary Industries (QDPI) Dairy Group is teaming up with the Mary River Catchment Coordinating Committee (MRCCC) on an important project exploring how protected fertilisers can boost productivity on farms while reducing impacts on our waterways and the Great Barrier Reef.

This work forms part of the Mary River Integrated Project, funded through the Queensland Government's Queensland Reef and Catchment Water Quality Program. The trial also has funding support from Seqwater's source protection program – Upper Mary Rivercare.

DPI-run plot trials are testing how these fertilisers behave under controlled conditions. The results will help build a clearer picture of how protected fertilisers could benefit dairy farmers and intensive grazing enterprises, which rely heavily on nitrogen to grow high quality feed.

The QDPI and MRCCC will share findings with local dairy farmers and help the community understand what the results might mean for our region.

Why Nitrogen Efficiency Matters

Dairy and intensive grazing systems rely heavily on nitrogen to grow high quality feed but traditional urea fertiliser can lose a significant portion of its nitrogen to



Photo 1. Gatton Plot Trial site

the air or through leaching. This means farmers may not get the full value of what they apply, and some of that lost nitrogen can end up in local waterways.

The More Profit from Nitrogen (MPfN) Report 2019 highlighted that improving nitrogen use efficiency is one of the biggest opportunities for boosting productivity in pasture based systems. It also found that enhanced efficiency fertilisers (EEFs) like Entec Urea – a nitrification inhibitor - can help reduce nitrogen losses, especially in subtropical regions.

What the QDPI Trials Are Looking At

The QDPI plot trials will combine DMPP (3,4 dimethylpyrazole-phosphate) - a nitrification inhibitor - with standard urea to see how it performs in terms of nitrogen retention, plant uptake and overall productivity.

DMPP slows the conversion of ammonium into nitrate, the form of nitrogen most easily washed into waterways. By keeping nitrogen in the soil longer, DMPP can help:

- Improve nitrogen uptake
- Reduce losses during heavy rain
- Support more consistent pasture growth

Importantly, DMPP has been found to significantly reduce nitrogen losses in high rainfall and irrigated systems, conditions familiar to many subtropical producers.

Reusing on farm effluent combined with DMPP

Another innovative treatment being tested is the use of effluent produced on farm, paired with DMPP to improve its nutrient value. This approach has the potential to:

- Make better use of nutrients already available on the farm
- Reduce the need for purchased fertiliser
- Improve nitrogen retention in effluent based applications
- Recycle farm waste in a productive, environmentally friendly way

For dairy and grazing enterprises that generate significant effluent, this could offer a practical and cost saving alternative to relying solely on synthetic fertilisers.

Benefits for the Great Barrier Reef

When nitrogen washes off farms, it eventually reaches the ocean as dissolved inorganic nitrogen (DIN). High DIN levels can fuel algal blooms and crown-of-thorns starfish outbreaks, both of which threaten the health of the Great Barrier Reef.

By improving nitrogen use efficiency on farms, protected fertilisers have the potential to:

- Reduce nutrient runoff
- Improve water quality in local waterways
- Contribute to better outcomes for the Reef

This project highlights the potential for farm productivity gains to align directly with positive environmental outcomes.

A Positive Step for Farms and the Environment

Protected fertilisers like DMPP—and innovative approaches such as pairing DMPP with on farm effluent—offer promising opportunities to improve nitrogen efficiency, reduce losses and support healthier waterways. As the QDPI's trials progress, MRCCC looks forward to sharing what the results mean for our region and how they might help both our farming community and local waterways to thrive.



Photo 2. DPI Researcher, Marcelo Benvenutti demonstrating how liquid effluent is applied with DMPP at the DPI's Gatton plot trials.



Photo 3. Mark Bauer (QDPI), Marcelo Benvenutti (QDPI), Alana Ebert (MRCCC) and Elke Watson (Sunshine Coast Dairy Farmer)



Photo 4. DMPP-coated urea and standard urea