

Keeping fertilisers, imidacloprid and herbicides on-farm: what can we do?



SRA project team members are now well into the final stages of completing Year Two trial sites for *Cane to Creek Mackay Whitsunday*. The project aims to bring water quality science direct to growers

THE *CANE to Creek Mackay Whitsunday* project aims to build the knowledge of farming practices and their effects on the quality of water leaving the paddock and on farm productivity.

This knowledge can be used by growers to select farming practices that are beneficial for both the environment and farm production.

The project will run over three growing seasons, with Year Two being the 2021/2022 growing season.

The farming practices considered in Year Two are listed at right in *Table 1*.

BELOW: Water sampling equipment in two strips at the Dows Creek site
Pictures: Contributed



By Matt Schembri, SRA Project Officer Central

Year	Growing Season	Site	Location	Farming Practice
2	2021/2022	1	Dows Creek	Impact of a liquid fertiliser (sub-surface applied) on pesticide and nutrient run-off
2	2021/2022	2	Glenella	Impact of inter-row cultivation (in ratoons) on pesticide and nutrient run-off
2	2021/2022	3	Reliance Creek	Impact of banded mill mud and mill mud/ash on pesticide and nutrient run-off

Table 1: Farming practices investigated in Year 2 of the *Cane to Creek Mackay Whitsunday* project

The sites consisted of six strips (each strip five or six rows wide) with the six strips to allow replication of the treatments.

Water monitoring equipment was set up at all of the strips of the sites. The equipment automatically collected samples from run-off water leaving the paddocks during rain events. These samples were subsequently analysed for nutrients, insecticides and herbicides.

At the Dows Creek site a liquid fertiliser/imidacloprid mix was compared to granular fertiliser/liquid imidacloprid application – both treatments were applied to best practice, that is at least 100 mm of depth using stool splitters. The strips were replicated three times.

Following several rain events, the run-offs of nitrogen in the form of DIN (dissolved inorganic nitrogen) and imidacloprid were very similar for both the liquid fertiliser/imidacloprid and the granular fertiliser/liquid imidacloprid treatments.

For the Glenella site we had three strips using the aerator and three strips without the aerator.

All six strips had the same fertiliser (surface applied liquid fertiliser) and pesticides (imidacloprid via a stool splitter, and residual herbicides broadcast over the trash blanket).

After eight run-off events we observed no difference in nutrient and pesticide run-off between the aerated and non-aerated strips. Our message here is that the aerator did not improve run-off water quality, but equally it did not reduce the water quality leaving the paddock.

Yield will be measured in the 2022 harvest season.

The treatments at the Reliance Creek site were applied in the following order:

- (i) all strips had granular fertiliser plus liquid imidacloprid via a stool splitter,
- (ii) banded mill mud, and
- (iii) residual herbicides broadcast using a boom spray.

Note that there were two strips of mill mud, two of mill mud/ash and two without mill mud as the control strips.

The run-off water quality results were consistent across the replicates, specifically the residual herbicides and imidacloprid recorded higher levels of run-off in the mill mud treatments as compared to where no mill mud was applied.

These results were the opposite to those predicted by a laboratory study of mill mud's properties.

Exploration of mill mud's effects on residual herbicides and imidacloprid will continue in the 2022/2023 growing season. As expected, the nutrient run-off was much higher in mill mud and mill mud/ash strips as compared to strips with no soil conditioners applied, most likely due to the presence of nitrogen in the mill mud. The nutrient run-off results do encourage consideration of the Six Easy Steps (6ES) Toolkit which calculates nutrient reduction to account for nutrients in the mill mud.

The trial sites in Year One and Year Two of our project were separate trials, each site investigating and comparing different farming practices. We observed an interesting finding when the trial site results were combined as shown in *Table 2*, below.

Year	Growing Season	Site	Imidacloprid (ppb)	DIN (ppm)
1	2020/21	Alligator Creek	1.8	0.4
1	2020/21	Balnagowan	6	22
2	2021/22	Dows Creek	1	0.5
2	2021/22	Glenella	10	10
2	2021/22	Reliance Creek	20	13

Table 2: Concentrations of imidacloprid and DIN in run-off water from the project sites with replicated treatments

The trial site paddocks were typical Central region soil types, and the Imidacloprid and fertilisers used were applied to best practice – yet two sites had low run-off water quality whilst three of the sites had higher levels of imidacloprid and DIN in their respective run-off waters. The reasons for these differences are under investigation.

The key message for growers is the importance of best practice application of imidacloprid and fertilisers – whilst the data suggests that best practice may not always give optimum water quality, it is the best we have at this stage.

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Aerator implement used at the Glenella site (thanks to the Portelli brothers, Farleigh for use of the implement).



Water sampling equipment in two strips at the Reliance Creek site.



SRA Project Officer Karanbir Singh Sidhu checks one of the sampler units at the Reliance Creek site in April 2022.

