WQ IMPROVEMENT - INSECTICIDE DEMONSTRATION RW

FIELD TRIAL

SANDY CREEK PROJECT

1.0 INTRODUCTION

Imidacloprid is a broad spectrum noenicitinoid insecticide that is commonly used in the sugarcane industry to prevent damage from canegrubs, which is currently the most significant economic pest of sugarcane in Australia. Water quality monitoring over recent years has seen increasing amounts of imidacloprid measured in local waterways, both in terms of higher concentrations and increasing detection frequency. Imidacloprid may pose a risk to the environment and at the same time is a cornerstone chemical to maintaining productivity within cane grub affected areas of the Australian sugarcane industry. It is imperative to manage it effectively so that the chemical will remain available to use for years to come.

An important component of mitigating the risks of imidacloprid leaving cane fields is improving application methods and equipment. The StoolZippa® is a relatively new implement on the market that is primarily used in cane ratoons as a closing wheel system, achieving complete slot closure to reduce fertiliser and chemical runoff. Its main objectives are to reduce imidacloprid runoff, nitrogen runoff and volatilisation and sunlight degradation.

This demonstration trial was put in place to evaluate the efficacy of imidacloprid application with stool zipper closure to reduce runoff in an overhead irrigated situation.

2.0 METHOD

In October 2018, the trial site was established in Chelona, Mackay.

Block Details: 1st ratoon Q240. The paddock had not previously been treated with imidacloprid. Growers current practice, where treating grub affected fields, is to apply imidacloprid with a disc opener assembly with no closure mechanism.

Soil Type: Calen and Brightly soil types - alkaline grey cracking clay duplex soil

Application: Imidacloprid was applied using a contractor's stool splitter with stool zippers attached. stool zippers were removed from the implement for treatment 2 applications.

Sampling: In-field runoff samples were collected during rainfall and irrigation events using KP composite event samplers. Harvest data (T/ha and CCS) was collected for each treatment.

Treatments:

- Treatment 1: Stool zipper with Nuprid 350SC @ 1.2 L/ha
- Treatment 2: No stool zipper with Nuprid 350SC @ 1.2 L/ha

2.1 TRIAL DESIGN

Replicate	**1**	**1**	**2**	**2**	**3**	**3**
Treatment	1	2	2	1	1	2
Rows	6	6	6	6	6	6

Treatment No	Product Details	Water Rate
1	Imidacloprid @ 1.2L/ha + stool zipper	100 L/ha
2	Imidacloprid @ 1.2L/ha no stool zipper	100 L/ha

3.0 RESULTS

3.1 RUNOFF

Site 1 2018-2019

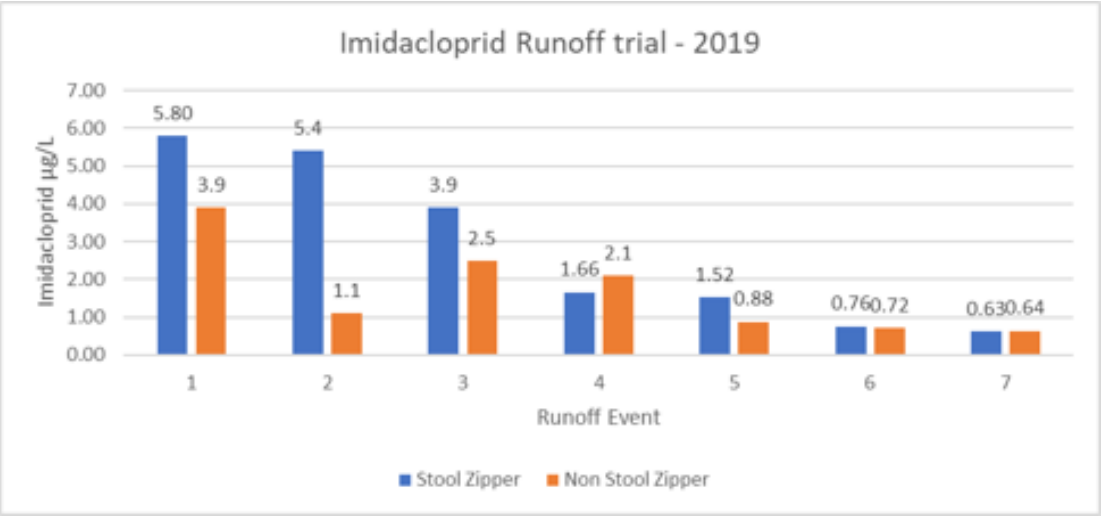


Figure 1. Comparison of 2019 Imidacloprid runoff concentrations between stool zipper and non-stool zipper treatments

Figure 1 shows higher concentrations of imidacloprid captured in the initial runoff events and concentrations gradually decreasing over the duration of the wet season. It also shows that for the first three runoff events, the concentration of imidacloprid is higher for the stool zipper treatment compared to the non-stool zipper treatment. There was only one runoff event (5) where the stool zipper had a lower concentration in its runoff.

Site 2 2019 – 2020

The trial was reapplied with treatments overlaid in the same strips as the previous year.

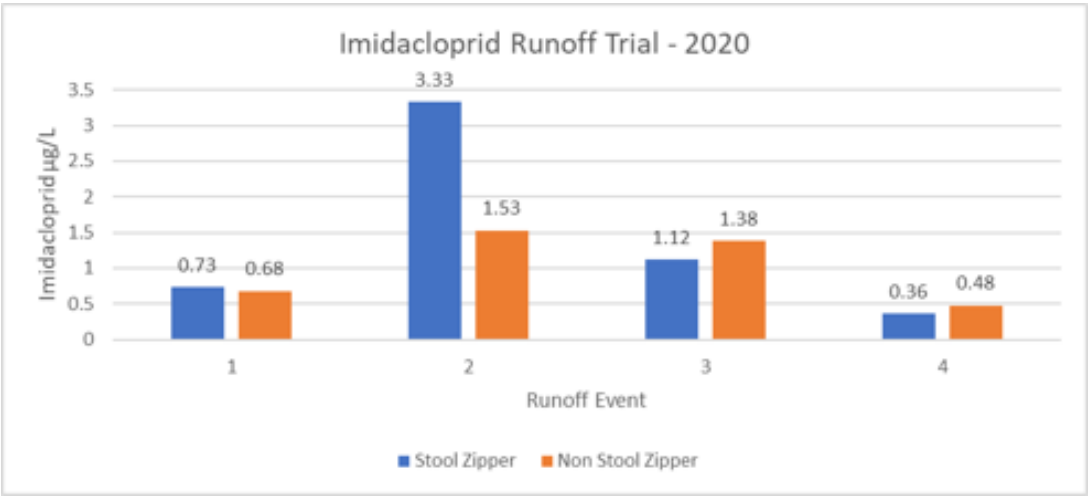


Figure 2. Comparison of 2020 Imidacloprid runoff concentrations between stool zipper and non-stool zipper treatments

Figure 2 shows higher concentrations of imidacloprid in the stool zipper treatments in events 1 and 2 and lower concentrations in events 3 and 4.

3.2 HARVEST DATA

Site 1 2018-2019

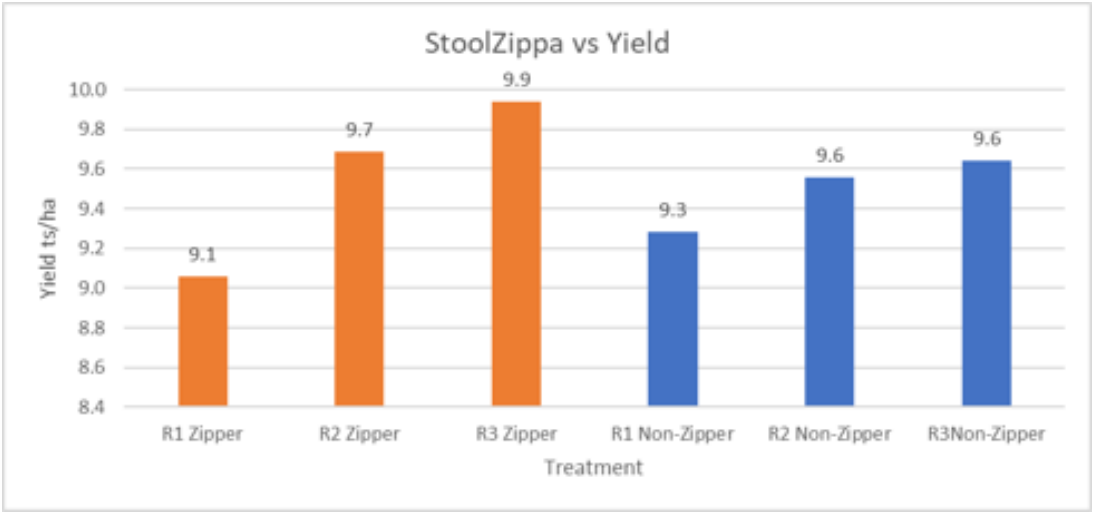


Figure 3. Tonnes of sugar per hectare for stool zipper and non-stool zipper treatments.

Figure 3 shows that the stool zipper treatment yielded lower tonnes of sugar than non-stool zipper treatment in R1, yet it yielded higher tonnes of sugar in R2 and R3.

4.0 DISCUSSION

This demonstration trial compared imidacloprid runoff concentrations between effectively closed and unclosed slots and crop yield to examine the benefits and economics of investing in Stoolzippa®'s.

The Stoolzippa treatments gave an adverse performance for imidacloprid runoff at most sampling event times. This is an unexpected result. There are several reasons why this may have occurred:

1. The slot in non-stool zipper treatments is left open and exposed to sunlight and is therefore subject to a higher rate of degradation. Due to the quicker breakdown, there may be less active ingredient present in the soil when runoff does occur, which could lead to lesser concentrations of chemical leaving the paddock during runoff events. With a closed slot such as the one that the StoolZippa produces, the chemical is preserved for longer in the soil and there is more active ingredient available to leave the paddock during runoff events.

2. The Stoolzippa fingers may have been set too deep and engaged with the product applied, potentially bringing some of the imidacloprid product closer to the surface where it may have been prone to increased runoff loss.

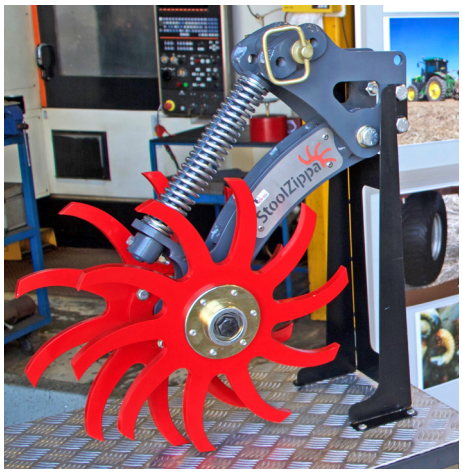
ABOUT THE PROJECT

The Sandy Creek Project will:

- **monitor sub-catchment water quality**
- **conduct paddock scale run-off trials**
- **direct extension activities to growers across the Sandy Creek sub catchment to improve chemical management practices**
- **provide a chemical management plan and targeted one-on-one agronomic services to all engaged growers in the Brightly south branch sub-catchment**
- **utilise grower led sub-catchment groups to promote WQ results and improved practices**
- **communicate the project, the outcomes and lessons learned to the broader Sandy Creek landholders**
- **apply strategies to overcome barriers to management practice change.**

There was no clear trend in sugar yield between treatments, with individual replicates yielding from 9.1 to 9.9 tonnes of sugar per hectare.

Other research has found that equipment, even with all the correct components, may not always be applying the product effectively. A possibility is that the stool zippers were set up to penetrate too deep when closing the slot. It is recommended that the stool zippers only penetrate the top 45mm of the soil, otherwise there is a high risk of disturbing the soil to the point where imidacloprid is being bought back up to the surface where it should not be. After the commencement of the trial there were awareness activities, training events and new research emerging that have helped to improve imidacloprid management in sugarcane. In future trial application and cover depth will be measured to ensure that equipment is functioning correctly. Additional trials are suggested to evaluate the efficacy of the StoolZippa further.



Left, a Stoolzippa attached to equipment, far left, a demonstration model

The Sandy Creek project has been funded by the Queensland Government's Reef Water Quality Program since 2015 after a group of growers sought assistance from the government to identify and better understand pesticide losses from their farms. Since 2018 there has been an increased focus on the Brightly sub catchment within Sandy Creek catchment because of its defined catchment and small number of growers.

REEF CATCHMENTS

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FARMACIST

Queensland Government

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