IMIDACLOPRID STEWARDSHIP VITAL FOR SUSTAINABLE AND PRODUCTIVE FUTURE

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Imidacloprid represents the sugar industry's best canegrub management tool and proper stewardship of this chemical is vital for the ongoing viability of cane farming in the 50 percent of soils where canegrub damage is common.

However, we have also seen imidacloprid detected in groundwater, wetlands, creeks and rivers, estuaries, flood plumes and marine environments.

The Queensland Government has proposed an aquatic ecosystem protection guideline value (freshwater) for imidacloprid of 0.11 µg/L to protect 95 percent of the species in the freshwater environment. (This is the same as 0.11 parts per billion.)

This is the maximum guideline value that should not be exceeded in creeks and rivers receiving runoff from sugarcane paddocks.

Many samples taken in waterways have recently been exceeding this guideline in each sugarcane growing region.

An annual load of 230kg imidacloprid was calculated for the Tully river catchment, 230kg for the Proserpine river catchment and 170kg for the Pioneer river catchment.

To improve water quality and ensure we are using imidacloprid effectively, two main strategies need to take place:

- Ensure growers only use the product in soils prone to canegrubs. Ideally an infestation assessment is carried out before product application (grub digging method, or knowledge of field history and likelihood of canegrub infestation); and
- In grub prone soil, ensure product placement is optimum and consistent to reduce the runoff risk.

SRA is undertaking a research project, ***Keeping our chemicals in their place - in the field***, that investigates the best application methods to reduce imidacloprid runoff.

So far, two rainfall simulation trials (three replicates) have been carried out in the Burdekin (Delta soil) and at Meringa (loamy sand), to assess the impact of depth and slot coverage on imidacloprid runoff when the liquid formulation is applied in ratoons, with a stool splitter.

Imidacloprid product labels state that, when applied in ratoons, the product must be placed at 10 – 12.5 cm depth and the slot must be covered. It has been frequently noticed that a variety of application equipment do not consistently maintain depth along the row and across the implement coulter assemblies and do not close the slot appropriately.

Both SRA trials relied on one single runoff event occurring 48 hours after product application (80mm of rain applied in one hour). Both rainfall simulation trials came to the same conclusions (Figure 1 and 2):

- More runoff is likely to occur from shallow application than deep application; and
- Coulter slots should be filled with soil after imidacloprid application, which is a label requirement. Our results suggest that the use of a press wheel further reduces imidacloprid runoff losses when the product is applied at the correct depth, however the press wheel may increase losses when the product is applied too shallow (probably because the wheel is occasionally in direct contact with treated soil).

Interestingly the runoff concentrations in both trials were very low, especially when applied at 10cm depth, and high imidacloprid concentrations seem to only occur in the case of shallow application. In our trials, we ensured that the application depth was very consistent. We suspect the imidacloprid concentration in runoff would increase further when the application is shallower than 5cm and likely explains why high imidacloprid concentrations are recorded in several catchments. The runoff from very shallow imidacloprid application will be trialled as part of the SRA research project in 2019-2020.

An additional trial was set up at Meringa on a grub-prone loam soil to test the efficacy of the StoolZippa to reduce imidacloprid runoff losses. The StoolZippa has been designed to improve closing of the coulter slot. This trial was set up as a strip trial with three replicates under overhead irrigation that delivered 100mm in five hours. Three runoff events were triggered every two weeks, with the first event occurring a week after product application. The imidacloprid was applied at 10cm depth, with the slot left either open or closed with the StoolZippa.

Again, very low imidacloprid concentrations were found for each of the three runoff events, as the product was consistently applied at 10cm depth.

The StoolZippa increased the imidacloprid concentrations in runoff versus the slot left open, however these concentrations were still extremely low and were not likely to create any water quality issues.

These preliminary results strongly indicate that applying the imidacloprid liquid at 10cm depth and ensuring this depth is consistent along the row and across all rows is the key to reduce imidacloprid runoff losses applied in grub-prone soil types. ■

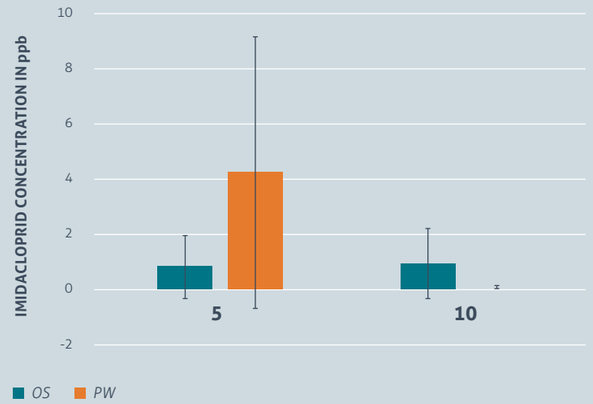

***Figure 1** - imidacloprid concentration in water at Meringa (**OS:** open slot, **PW:** press wheel, **5:** application at 5cm depth, **10:** application at 10cm depth).*

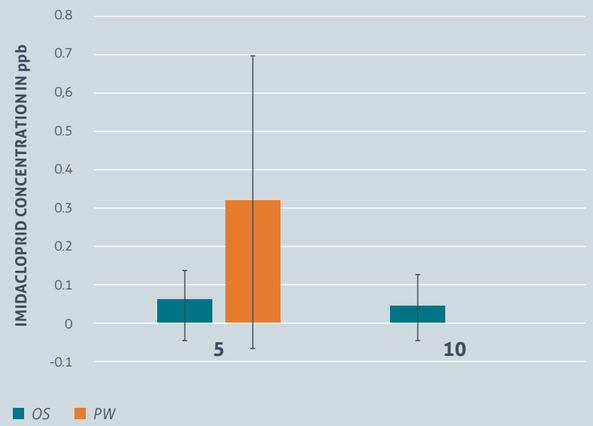

***Figure 2** - imidacloprid concentration in water at Brandon (**OS:** open slot, **PW:** press wheel, **5:** application at 5cm depth, **10:** application at 10cm depth).*

***Figure 3** - imidacloprid concentration in runoff water at Meringa (**OS:** open slot, **ZIP:** StoolZippa, application at 10cm depth).*