



Growers and advisors viewing the on-farm demonstrations at the Tully farm of Don Colls.

## Practical on-farm demonstrations help boost efficiency and sustainability

*Protecting Our Chemicals for the Future is a project based in the northern Wet Tropics that works with grower groups to demonstrate the value of best management practices for chemical management on sugarcane farms. By Belinda Billing, Researcher, SRA*

### Project details

#### Key Focus Area

**Knowledge and Technology Transfer and Adoption**

#### Project name

Protecting our chemicals for the future

#### Project number

2016/002

#### Chief investigator

Belinda Billing

The project looks at both water quality and weed management outcomes from improved management practices through on farm demonstrations and the use of water quality measurement tools such as a rainfall simulator.

The project has provided growers and extension staff with useful information for understanding chemical behaviour and practical ways of reducing off-site movement.

“The data has shown us new information, especially about the chemicals that are new for the industry,” says Tully Productivity Services Manager Jordan Villaruz.

“We can use this information when we provide chemical recommendations for growers. We need to consider all things when we are choosing herbicides, such as the efficacy of weed management, the cost, and the environmental impact.”

#### What is a rainfall simulator?

A rainfall simulator is a tool for simulating a rainfall event at a small plot scale, with a pre-determined “rainfall” intensity over a given time.

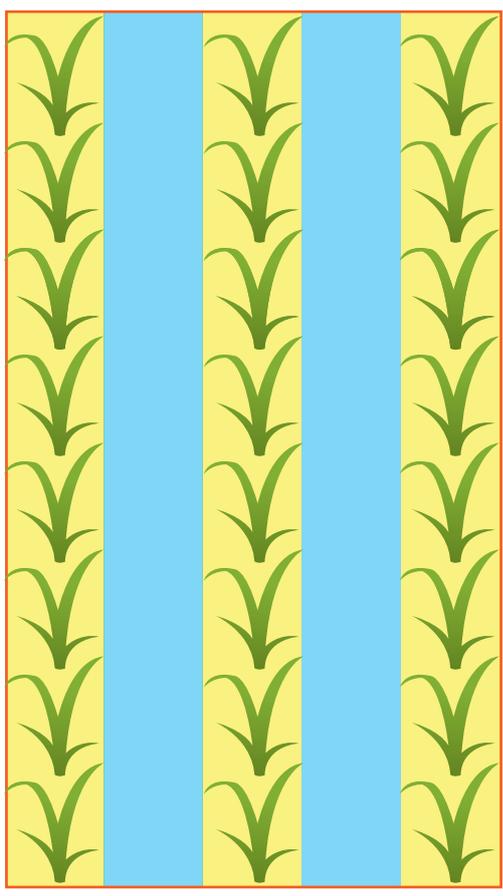
Simulators are used to measure losses of sediment, nutrients and pesticides and the amount of rainfall runoff under different conditions and time scales.

In this project we have used a rainfall simulator to look at losses from different herbicide application techniques and various herbicides commonly used in sugarcane. We simulated rainfall run-off at both three days after application and 20 days after application.

**Apply less – lose less**

Barrage (diuron and hexazinone) was applied to plots in a fifty percent band using a DAF dual herbicide spray bar. The spray bar directs the chemical predominantly towards the cane row, with a portion of the inter-row covered. Glyphosate was applied to the inter-row. This was compared to a blanket application of Barrage, applied with a flat spray boom.

Our rainfall simulations showed at least a fifty percent reduction in the loss of residual herbicides. Where less residual chemical is applied, there is less to lose to the environment. This can be achieved by banding, spot spraying or zonal treatment.

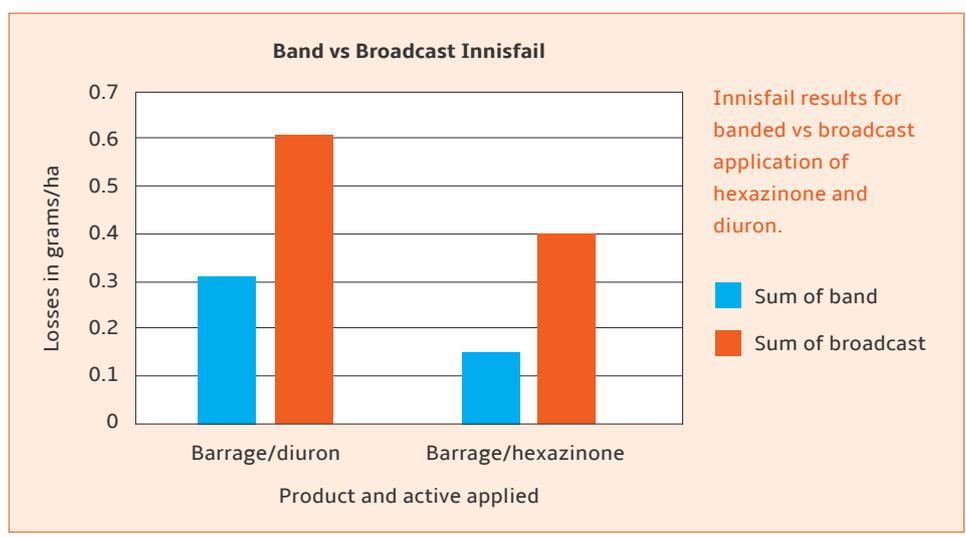


**Left:** Yellow band represents banded application of Barrage. Blue represents inter-row sprayed with glyphosate.

**Note:** If applying Barrage, Bobcat® combi or other diuron/ hexazinone herbicides after cane emergence at last cultivation or at close-in, it is a label requirement to only apply as a directed band spray over a maximum 60% of crop area unless applying at the lower rates of 900g/ha or less.

In the Queensland Wet Tropics, these products are only registered for rates below 900g/ha.

(In the rainfall simulation activity both the broadcast and banded application were applied at 900g/ha).



**Weed management in Sugarcane Manual**

Page 38 of the SRA Weed Management in Sugarcane Manual contains an error. Imazapic (Flame®) is included as a treatment for soybean. **Imazapic is not registered for use in soybean.** Apologies for this inadvertent error and thank you to those who brought it to our attention.

**Timing, incorporation and chemical selection**

A selection of commonly used residual and knock down chemicals were applied as a broadcast at 20 days and three days prior to applying the rainfall simulator to generate runoff.

Residual chemicals	Knock down chemicals
Atradox® (atrazine), Balance®750 (isoxaflutole), Barrage (hexazinone & diuron), Nufarm Bouncer 960S (s-metolachlor), Mentor®WG (metribuzin), Spark® (imazapic), Romper 440 EC (pendimethalin)	Agritone®750 (MCPA), Amicide® Advance 700 (2,4-D), Comet 400 (fluroxypyr), Kamba® 500 (dicamba), Nuquat® 250 (paraquat)

There was a significant reduction in losses of all chemicals when simulated rain was applied 20 days after application compared to three days after application.

This is due to increased time for binding to soil particles and chemical break down. Incorporating rainfall of 20mm over this time also helped to reduce run off by incorporation of chemical applied.

On both the three day and 20 day treatments, some chemicals consistently recorded low and even zero loss while others resulted in higher losses.

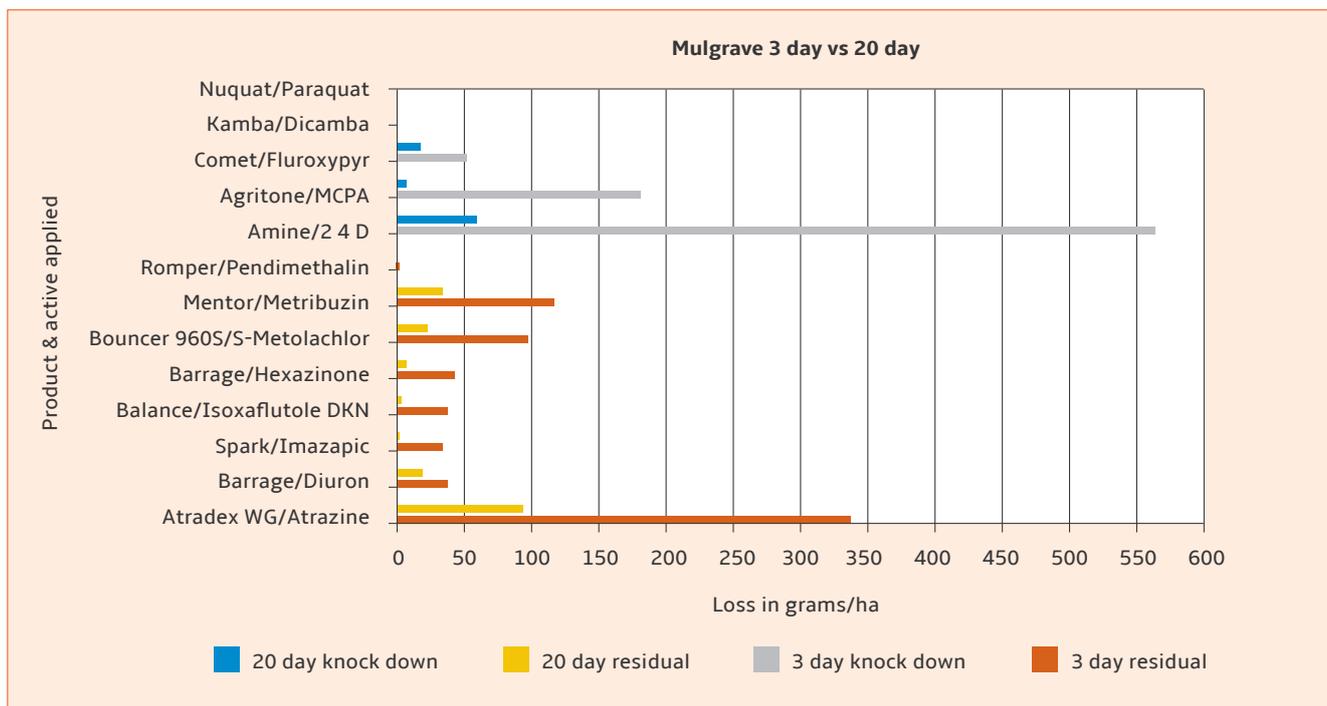
Examples of low losses are paraquat (zero loss across three site), dicamba (close to zero loss across three sites) and pendimethalin.

Higher losses were recorded with more mobile products such as atrazine and metribuzin in the residual chemical suite and 2,4-D and MCPA in the knock down suite. Factors that contribute to this are:

- Greater mobility (solubility in water and less ability to bind to soil) increases risk of loss and,

- The rate (or total amount) of the chemical applied; lower applied volumes reduce the risk of loss.

Early in the season there is a greatly reduced chance of loss of chemical to the environment. As the wet season approaches, and the likelihood of runoff within 20 days is increased, choose chemicals and your method of application carefully.



**A note on relative risk**

These results show loss of herbicides to the environment. This is one aspect of the risk posed by agricultural chemicals to the environment.

Any chemical's risk to the environment is also a factor of toxicity and half-life (length of time for the concentration of the chemical to decrease by half).

The relative risk of each chemical is also connected to mobility, which is a combination of the chemical's ability to bind to soil or organic matter and how soluble it is, which is reflected in the rainfall simulation results.

SRA is working with James Cook University, Department of Science, Information Technology and Innovation and the Department of Environment and Heritage Protection to bring this information together to create a resource that cane farmers can use when selecting chemicals.

**Future activities**

We are planning and implementing a series of paddock scale demonstrations with end of row water quality monitoring.

Growers in this project have had input into the treatments applied for both paddock scale demonstration and the 2017 rainfall simulation activities.

If you grow sugarcane in the northern Wet Tropics and would like to learn more or get involved contact Belinda Billing on 0475 954 437 or email [bbilling@sugarresearch.com.au](mailto:bbilling@sugarresearch.com.au)

The project is a collaborative effort, with SRA, EHP, TCPSL, Bayer, Crop Care, JCU, Tully Sugar and QDAF to address best management of weeds and pests and improving water quality in the Wet Tropics.

We acknowledge the support of MSF sugar.