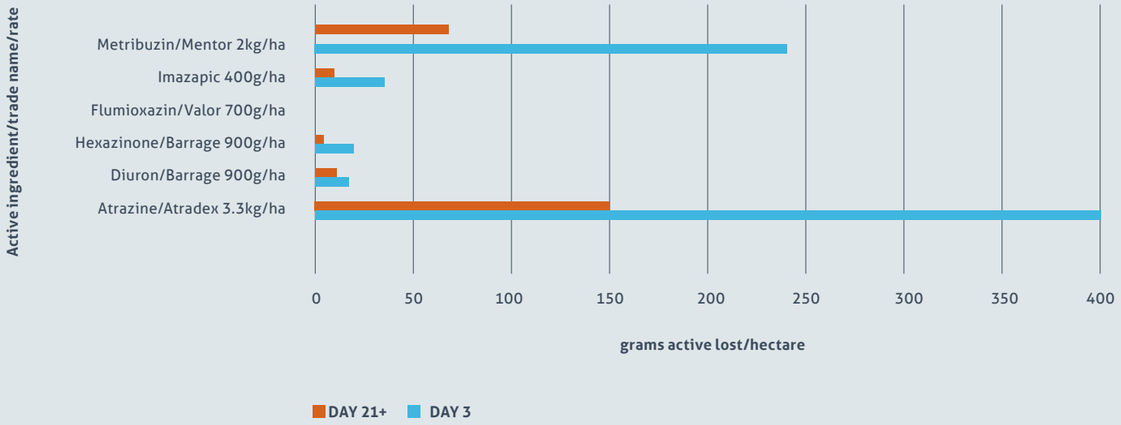
Timing study –
3 day vs 21 day

Banded vs broadcast application of residual herbicide Mulgrave study



COMPARING KNOCK DOWN HERBICIDE STRATEGY WITH RESIDUAL HERBICIDE STRATEGY IN RATOON CANE

Sugar Research Australia

Grower: Ray Zamora

Location: Riversdale area, Tully
Ratoon: 3rd Variety: Q208(l)
Harvested: 6 July 2017
Row spacing: 1.8m

Known issues: Light to medium weed pressure, block fallowed with two crops of soybean prior to planting to reduce weed pressure and improve soil condition, allowing minimum herbicide use throughout ratoons.

Protecting our Chemicals for the Future Through the Acceleration of Best Management Practices.

Treatments applied after harvest

T1: RESIDUAL CONTROL	T2: KNOCK DOWN CONTROL	T3: CONTROL
11 July 2017 Imazapic @ 400g/L (Flame, Spark etc.) Paraquat @1.2L/ha **Cost: $15/ha**	1 September 2017 2,4-D @ 1 L/ha Picloram & 2,4-D /Tordon @0.5L/ha **Cost: $15/ha**	No treatment applied
27 October 2017 Metribuzin (Mentor, Tomahawk) @ 1.5L/ha 2,4-D @ 1.5L/ha Paraquat 1L/ha **Cost: $75/ha**	3 November 2017 Paraquat 1.2L/ha **Cost: $5/ha**	Spray out with paraquat December.
Spot spray glyphosate @ $10/ha **Total cost: $90/ha**	Spot spray glyphosate @ $10/ha **Total cost: $30/ha**	

Efficacy for after harvest: Monthly monitoring conducted from post spray through to February. Both treatments were effective, and a third knock down pass was not required.

For more information

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Knock down vs residual control average % weed cover

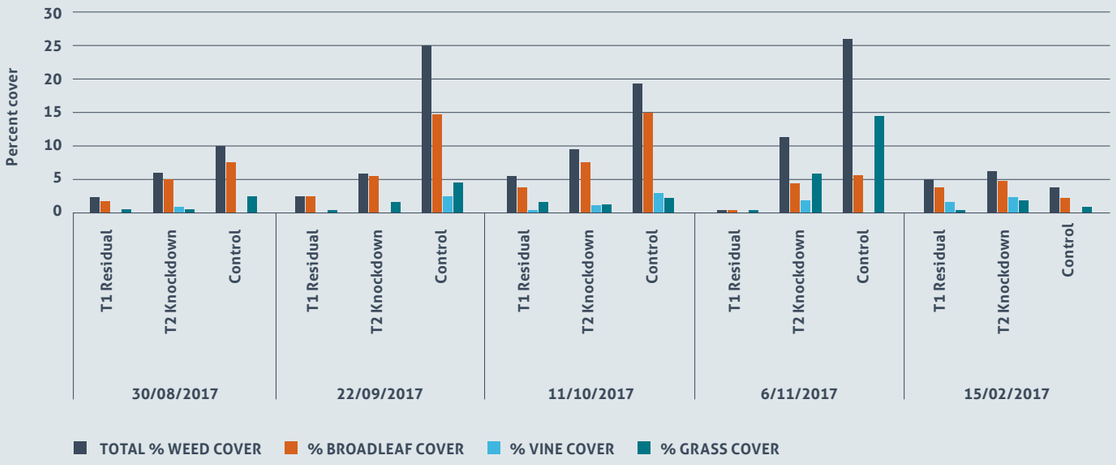


Chart shows average percent weed coverage of monitoring plots (16 plots / treatment)

T1: Residual control, September 2017

T2: Knock down control, September 2017

Control: No spray, September 2017

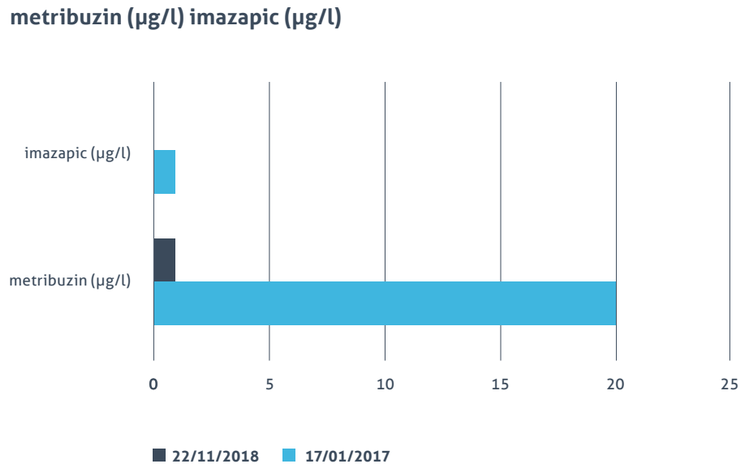
T1: Residual control, February 2018

T2: Knock down control, February 2018

Control: No spray, February 2018

What about water quality?

The graphs show analysis of two runoff events. The time between herbicide application and runoff events has led to much greater losses of metribuzin, applied much closer to the wet season than the Imazapic, which had four months between application and a runoff event. (Note: no residual herbicides were applied to Treatment 2. Due to the lower eco-toxicity and short half-life of knock down chemicals no analysis was completed for any of the products applied.)



Rainfall: 60mm on 22 November 2017 and 100mm on 17 January 2018.
Imazapic was not detected on the January event.

Proposed freshwater eco-toxicity thresholds - the lower the value, the greater the toxicity.

ACTIVE	TRADE NAME	99% PROTECTION IN µg/l	95% PROTECTION IN µg/l
Imazapic	Flame, Spark	0.036	0.41
Metribuzin	Mentor, Tomahawk	2	2.6
2,4-D	Amine 2,4-D (marine values only available)	1,040	2,516

Note: no values available for picloram and paraquat.
Waterhouse et al, 2017 Scientific Consensus Statement 2017: A synthesis of the science of land-based water quality impacts on the Great Barrier Reef, Proposed ecotoxicity thresh-holds King, O et al. 2017

Key messages:

Less product on, less product off:
A ratoon block with low weed pressure can effectively be managed with low risk knock down chemicals.

Timing is key:
More time between application of herbicide and rainfall that runs off the paddock results in less product lost to runoff.