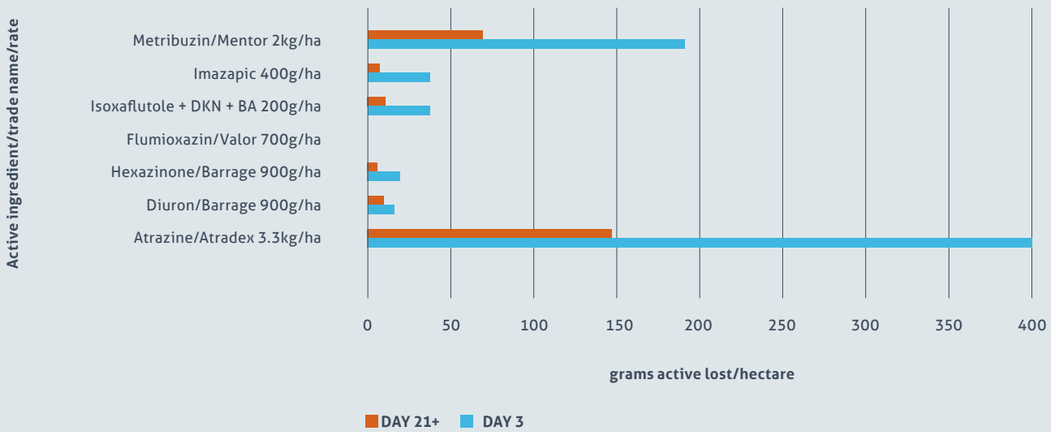
Compare these results with Tully Protecting our Chemicals for the Future Rainfall simulation – losses for most herbicides will reduce with more time between application and run off. In most cases where a herbicide is applied at a high rate the losses will be greater. A small number of herbicides have a very high KoC (ability to bind to soil particles) and therefore have low losses regardless of rate, an example is pendimethalin, and perhaps flumioxazin.

Timing study – 3 day vs 21 day

Tully Timing and Product Ratoon



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

For more information

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AFTER HARVEST NON-PSII STRATEGY VS GROWER PRACTICE

Sugar Research Australia

Grower: Anonymous

Location: Mulgrave, Gordonvale
Ratoon: 3 Variety: Q208(ɔ)
Harvested: 5 September 2017
Row spacing: 1.5m

Medium weed pressure, with historic para-grass, sicklepod and vine.

This demonstration showed the benefits of after harvest application of a non-PSII residual herbicide (imazapic) which proved effective in terms of cost, efficacy and dollars. The demonstration also showed the benefit of targeting sicklepod with 2,4-D + picloram.

Treatments applied

T1: GROWER PRACTICE	T2: AFTER HARVEST NON PSII	CONTROL
After harvest broadcast: 12/09/2017 Atrazine @ 500g/ha MSMA (Daconate) @ 1l/ha, & Paraquat @1.2l/ha **Cost: $33/ha**	**After harvest broadcast: 14/09/2017** Imazapic (Spark) @ 400ml/ha & Paraquat @ 1.2l/ha **Cost: $17/ha**	No spray
DATE 21/11/2017 Fluroxypyr (Comet 400) @1.5L/ha 2,4-D & Picloram / Enforcer 75D 75/D @700ml/ha **Cost: $61/ha**	**DATE 03/10/2017** 2,4-D @ 625 L/ha Picloram & 2,4-D /Enforcer 75D @700ml/ha DATE 20/11/2017 2,4-D @ 625ml/ha Picloram & 2,4-D / Enforcer 75D @700ml/ha **COST: $30/ha ($15/ha per spray)**	
Spot spray Diuron 1kg, MSMA (Daconate) 700ml, paraquat 1L /300L = $40/300L **Total cost: $94 + spot spray**	**Spot spray** Diuron 1kg, MSMA (Daconate) 700ml, paraquat 1L /300L = $40/300L **Total cost: $47/ha + spot spray**	**Spot spray** Diuron 1kg, MSMA (Daconate) 700ml, paraquat 1L /300L = $40/300L

Efficacy for after harvest: Monthly monitoring conducted from post spray through to October.

T1: GROWER PRACTICE	T2: PROPOSED PRACTICE	CONTROL
Dry weather early on, very limited pressure. First rain high numbers of sickle pod and grass patches emerged.	Dry weather early on, very limited pressure. First rain high numbers of sickle pod and grass patches emerged. Better control of grass and sickle pod using targeted products.	Dry weather early on, very limited pressure. First rain high numbers of sickle pod and grass patches emerged.

Weed pressure under banded vs broadcast residual chemicals + knock down application with highrise to all

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

T1: 26/09/2018

T2: 26/09/2018

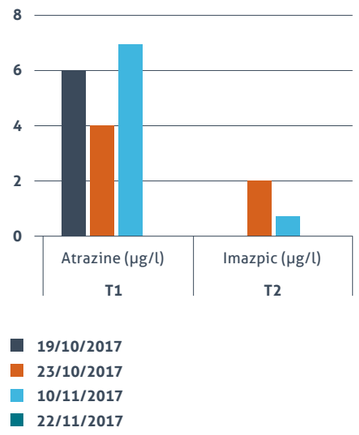
Control: 26/09/2018

Space for a photo?

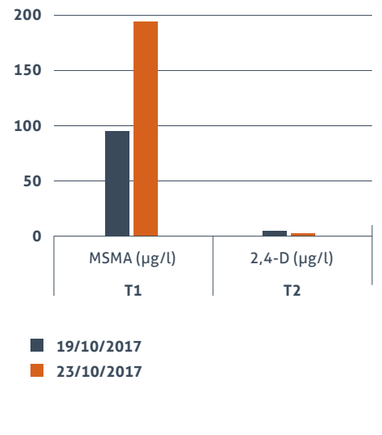
What about water quality?

This site has springs close to the surface and as such reaches runoff point quickly. Monitoring of four events in the months after chemical application showed a higher amount of atrazine in runoff than imazapic. Knock down chemicals were analysed for in the initial two rainfall events only and showed high amounts of the persistent and moderately toxic MSMA in runoff water, very little 2,4-D and no picloram. By November 22 no chemical was detected. No further monitoring was undertaken.

Gordonvale runoff: residual chemicals



Gordonvale runoff: knock down chemicals



Rainfall: *19 October 2017 166mm, 23 October 2017 44mm, 10 November 2017 31, 22 November 2017 22mm.*

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
2,4-D*	Amine 2,4-D (marine values only available)	1,040	2,516
Fluroxypyr	Starane, Comet	87	200

Note; no values available for atrazine, MSMA, 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:

Timing is key: More time between application of herbicide and rainfall that runs off the paddock results in less product lost to runoff. Application of herbicides one month before rainfall that ran off resulted in low levels of residual chemicals lost to runoff.

Product selection: MSMA is an arsenic based chemical and therefore is stable in the environment. It will persist for a long time and can build up in soils. The shorter half-life of other knock down chemicals, such as 2,4-D and picloram resulted in little or no chemical being detected in analysis of runoff. Imazapic requires a lower rate for effective control than atrazine, therefore losses of imazapic were lower than atrazine.