PATHWAYS TO WATER QUALITY IMPROVEMENTS IN THE MYRTLE CREEK SUB-CATCHMENT

2020/2021 WET SEASON - SITE 1

SITE DETAILS

BLOCK SIZE:
2.8 ha

SAMPLED AREA:
0.336 ha

ROW SPACING:
1.6 m

VARIETY:
Q183(1)

CROP CLASS:
P

HISTORICAL ANNUAL YIELD:
95 tph

SOIL TYPE:
Benholme (cracking clay)

LOCATION IN SUB-CATCHMENT:
Foxdale

NUTRIENT AND PESTICIDE APPLICATION DETAILS

Fertiliser application date: 1 August 2020 plant starter / 17 November 2020 top dressed.
Insecticide application date: 17 November

Treatment 1 = Liquid

- 17 November - Nuprid @ 1L/ha
  - Total imidacloprid applied: 350g/ha

Treatment 2 = Granular

- 17 November - SuSCon® maxi Intel® @ 15kg/ha
  - Total imidacloprid applied: 750g/ha

Fertiliser Application:

- NKS Plant Starter @ 200kg/ha before plant + follow up application
  - Total nutrient applied:
    N – 130kg/ha
    P – 20kg/ha
    K – 100kg/ha

- Winched four times before first run-off event. Two irrigations between planting and top dress fertiliser. One irrigation September prior to chemical application and one irrigation after chemical application. Approximately 30mm per application. No run-off was generated from these irrigations.

HERBICIDE APPLICATIONS:

2020:

- 17 September
  - 1.8 L/ha Dual Gold ® (1728g/ha S-metolachlor)
- 20 December
  - Bobcat i-MAXX SG (750g/kg Hexazinone and 150g/kg imazapic)
  - Amine 625 (625 g/kg 2,4-D)
  - Gramozone 250 (250 g/kg paraquat)

2019 (fallow):

- Amine 700
- Glyphosate 540

TESTED FOR:

- Dissolved Inorganic Nitrogen (DIN)
- Filterable Reactive Phosphorus (FRP)
- Imidacloprid
- Metolachlor
- Hexazinone
- Imazapic

RUNOFF EVENT DATA

EVENT	DATES	DAYS FROM LAST FERTILISER, HERBICIDE AND PESTICIDE APPLICATION
1	7 January 2021	51
2	8 January 2021	52
3	10 January 2021	54
4	11 January 2021	55
5	12 January 2021	56

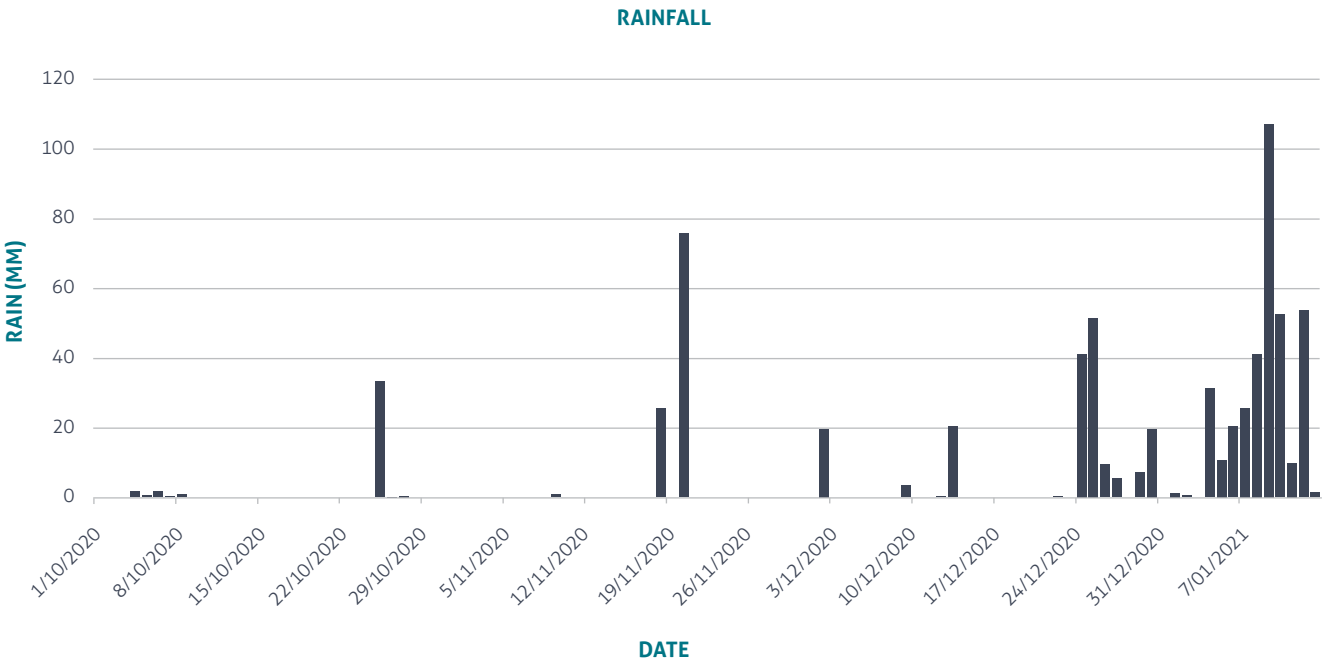

Figure 1 Rainfall data measured at Wandarra weather station.

RESULTS

NOTE: *Nutrient and pesticide loads are estimates only. Freshwater ecotoxicity thresholds cannot be applied to paddock scale monitoring. Freshwater aquatic ecosystem species protection values are referenced only for discussion. P concentrations are indicative and actual concentrations are likely to be slightly higher.*

DIN (Dissolved Inorganic Nitrogen)

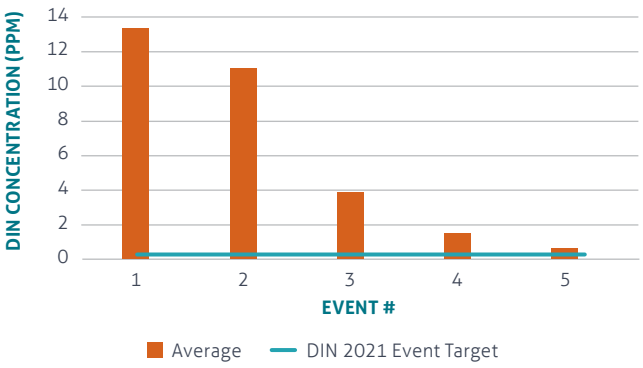

Figure 2 DIN concentration in run-off (ppm). The Mackay Whitsunday Water Quality Plan's DIN water quality in event current conditions is 0.429 ppm and 2021 event target is 0.300 ppm, both for the Myrtle Creek. Provided for discussion only.

FRP (Filterable Reactive Phosphorus)

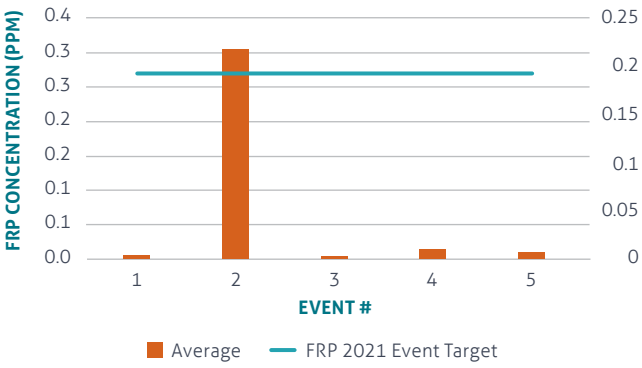

Figure 3 FRP concentration in run-off (ppm). The Mackay Whitsunday Water Quality Plan's FRP water quality in event current conditions is 0.200 ppm and 2021 event target is 0.193 ppm, both for the Myrtle Creek. Provided for discussion only.

IMIDACLOPRID

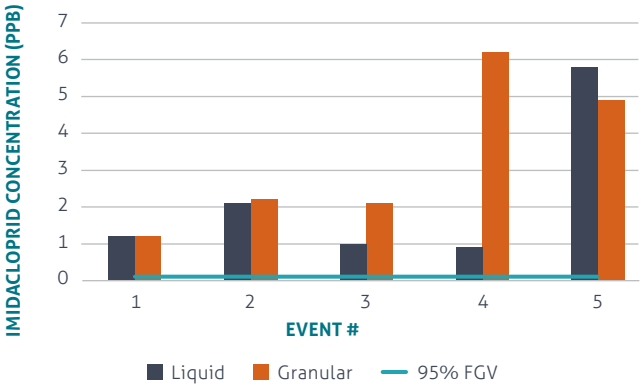

Figure 4 Imidacloprid concentration in run-off (ppb). Freshwater guideline value (95% FGV) is the aquatic ecosystem protection guideline value at the 95% species protection level and is applicable only to freshwater systems. Imidacloprid value is 0.11 ppb. Provided here for discussion only.

METOLACHLOR

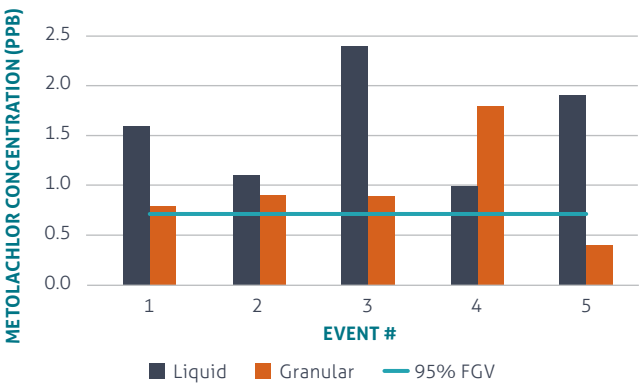

Figure 5 Metolachlor concentration in run-off (ppb) from Treatment 1. Freshwater guideline value (95% FGV) is the aquatic ecosystem protection guideline value at the 95% species protection level and is applicable only to freshwater systems. Atrazine draft value is 1.8 ppb. Provided here for discussion only.

HEXAZINONE

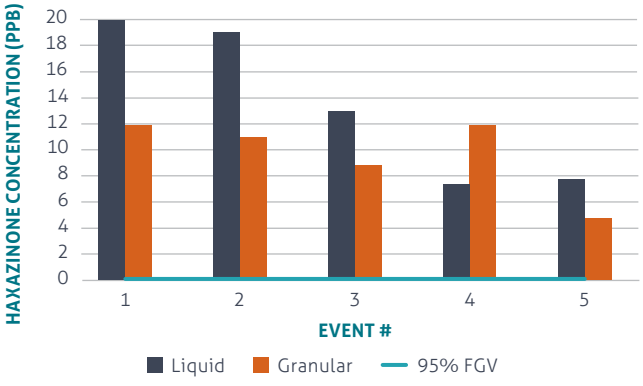

Figure 6 Hexazinone concentration in run-off (ppb). Freshwater guideline value (95% FGV) is the aquatic ecosystem protection guideline value at the 95% species protection level and is applicable only to freshwater systems. Imidacloprid value is 0.11 ppb. Provided here for discussion only.

IMAZAPIC

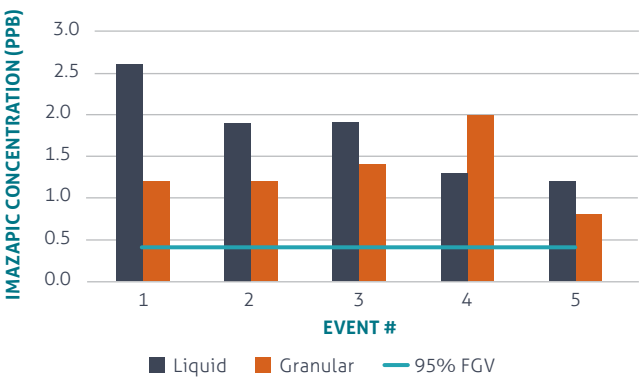

Figure 7 Imazapic concentration in run-off (ppb). Freshwater guideline value (95% FGV) is the aquatic ecosystem protection guideline value at the 95% species protection level and is applicable only to freshwater systems. Imidacloprid value is 0.11 ppb. Provided here for discussion only.

DISCUSSION

Please note that all concentrations are estimates only. This is not a replicated research trial. Due to equipment limitations, water samples based on flow were unable to be collected for the entire events. This may result in actual concentrations being higher or lower than the estimates provided. The information is provided as a guide for comparison between treatments at this site only.

This site had very limited surface run-off during rainfall events, which were expected to generate significant surface run-off. It is likely that most water was draining into the surface layer of the soil and then flowing through the soil horizontally rather than on top of the surface. This made it very difficult to obtain estimates of water lost from this site. Estimates have therefore not been given for loss of products. Only concentrations have been provided, of which many were grab samples, due to lack of surface run-off.

Higher DIN losses were demonstrated at this site, compared to the other sites this season. DIN losses may be higher at this site due to the crop being plant cane. Higher N mineralisation may have occurred over the fallow period when compared with ratoon crops.

Previous research has shown suSCon® maxi Intel ® to have less loss than Confidor® Guard (Fillols, data).

Previous research shows losses of 13% of many applied herbicides if run-off occurs after 48 hours or so (this excludes pendimethalin and flumioxazin which have significantly lower losses (see The Herbicide Risk Matrix). This suggests that APPLICATION RATE is the major influence on losses.

REFERENCES/FURTHER INFORMATION

The Herbicide Risk Matrix - Attachment 1

Runoff Loads Compared to Application Rate. Fillols, E. 2018.

Mackay Whitsunday Water Quality Improvement Plan 2014-2021. Folkers, A., Rhode, K., Delaney, K. & Flett, I. 2014.

FOR FURTHER INFORMATION PLEASE CONTACT

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