PADDOCK TO REEF

PADDOCK TO SUBCATCHMENT SCALE WATER QUALITY MONITORING OF SUGARCANE MANAGEMENT PRACTICES – MACKAY WHITSUNDAY

The Mackay Whitsunday Paddock to Reef water quality monitoring sites are run on two farms with different soil types that represent 44% of soils in the Mackay Whitsunday area (loam over clay and black cracking clay). Both sites are looking at the effect of row spacing (controlled traffic versus conventional), nutrition (mainly nitrogen & phosphorus) and herbicide options (knockdowns & residuals) on productivity, profitability and water quality. See table below for treatment specifications.

The aim of these trials is to show that industry promoted current best practices, will not only improve growers profitability, but will also provide water quality benefits.

TRIAL DESCRIPTION

ABCD Classification		Soil Management	Nutrient Management	Herbicide Management
Victoria Plains site – uniform cracking clay				
Treatment 1	CCC[1]	1.5 m current practice	Generalised recommendation	*Residual* Velpar K4 (3.8 kg/ha)
Treatment 2	BBB	1.8 m controlled traffic	Six easy steps	*Knockdown & Non PS2 Residual* Flame (0.4 L/ha)
Marian site – duplex soil				
Treatment 1	CCC	1.5 m current practice	Generalised recommendation	*PS2 Residual* Actril DS (1 L/ha) Asulox (6 L/ha) Atradex 900 (2 kg/ha) Gramoxone 250 (1.2 L/ha) Amicide 625 (1 L/ha)
Treatment 2	BCC	1.8 m controlled traffic	Generalised recommendation	*PS2 Residual* Atradex 900 (2 kg/ha) Gramoxone 250 (1.2 L/ha) Amicide 625 (1 L/ha)
Treatment 3	BBB	1.8 m controlled traffic	Six easy steps	*Knockdown* Gramoxone 250 (1.2 L/ha) Amicide 625 (1 L/ha)
Treatment 4	BAB	1.8 m controlled traffic	Nutrient replacement	*Knockdown* Gramoxone 250 (1.2 L/ha) Amicide 625 (1 L/ha)
Treatment 5	ABB	1.8 m controlled traffic, skip row	Six easy steps	*Knockdown* Gramoxone 250 (1.2 L/ha) Amicide 625 (1 L/ha)

[1] *– ABCD classifications for soil/sediment, nutrients and herbicides, respectively*




OUTCOMES FROM THE SECOND YEAR OF MONITORING

Results from the 2010/11 season showed the same trends between treatments as those observed for the 2009/10 season, despite the higher than average rainfall. Differences between sites highlights the importance of soil characteristics, input application rates, and the duration between application and the first runoff event on nutrient and herbicide losses in runoff water.

Higher nitrogen inputs and high background soil phosphorus levels can lead to larger runoff losses. Matching row spacing to machinery track width can reduce runoff and therefore reduce off-site transport of nutrients and herbicides. The 1.5 m and 1.8 m row spacing treatments produced similar cane yields, particularly at the Marian site with wet and waterlogged conditions limiting full yield potential.

VICTORIA PLAINS

At the Victoria Plains site (cracking clay), controlled traffic on wider row spacings resulted in a reduction in runoff.

- Total runoff from Treatment 2 averaged 14% less than Treatment 1 (1751 and 2025 mm, respectively from 3300 mm rainfall). Runoff from Treatment 2 was delayed on average by ~11 minutes compared with Treatment 1, and the peak runoff rate was ~33% lower, all contributing to reduced runoff. These results reflect 2009/10 results with Treatment 2 averaging 18% less than Treatment 1.
- After nitrogen application nitrogen concentrations in runoff were dominated by urea-N, with concentrations highest in Treatment 1. The total wet season loss of urea in runoff from Treatment 1 was 16 kg/ha and 13 kg/ha from Treatment 2. Less rainfall in 2009/10 resulted in a more pronounced difference with nitrogen losses of 13 kg/ha for Treatment 1 and only 4.85 kg/ha for Treatment 2.
- Most of the herbicide losses of diuron and hexazinone occurred in the first runoff event from Treatment 1, which was seven days after the application of Velpar K4. About 92% of the total diuron and hexazinone loss occurred within one month of application. This month accounted for only 6% of the total seasons' runoff.
- Yield results of the first ratoon cane crop were 62 t/ha for Treatment 1 and 48 t/ha for Treatment 2. The lower yield from Treatment 2 is thought to be due to the lower application of nitrogen and the wet, waterlogged conditions. There was no yield difference in the plant crop (av. 102 t/ha) of 2009/10.

MARIAN SITE

The Marian site (duplex soil) flooded several times making it difficult to collect data.

- Total suspended solid concentrations were much higher than those recorded from the Victoria Plains site (treatment averages 176-772 mg/L), presumably due to low cover from cultivation and no trash blanket.
- After fertiliser application nitrogen concentrations in runoff remained above pre-application concentrations for ~2 months. Average nitrogen runoff concentrations for the 1.8 m treatments reflected the rate of nitrogen applied (with the exception of the skip row).
- Average phosphorous concentrations were ~10-fold more than those detected at the Victoria Plains site reflecting a higher background soil concentrations (311-900 µg/kg at the Marian site compared to 42-51 µg/kg).
- Yield results of the first ratoon cane crop were similar between treatments (38-43 t/ha), except for the skip row treatment (21 t/ha) due to only 56% of the treatment area planted to cane.

CONTACT

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