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RRRD037: Pesticide dynamics in the Great Barrier Reef catchment and lagoon: management practices in the sugarcane industry

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Half lives of pesticides used in sugarcane

Objective: Determine the half lives in soils (and other key properties) of key pesticides used in the Great Barrier Reef catchment.

Personnel involved: S. Lewis, A. Davis & L. Glendenning, JCU; M. Silburn & M. Shaw, DERM and R. Kookana, CSIRO.



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Project description

Methods: Soil and trash samples will be collected at different depths in the soil profile over selected intervals as well as surface runoff samples to calculate a pesticide mass balance and determine half lives.

Geographic scope: Tully-Murray, Burdekin, Mackay Whitsunday.

Outputs: Results will directly inform the How Leaky? model to improve modelling of pesticides in the GBR catchments, to better predict loads and to compare with water quality targets.





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Alternative pesticide products used in sugarcane

Objective: Investigate the potential water quality and agronomic benefits of alternative herbicide products (to those currently used) used in sugarcane including Balance, Flame, Soccer and Krismat.

Personnel involved: S. Lewis & A. Davis, JCU; R. Milla, DEEDI and E. Fillols & T. Anderson, BSES.



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Project description

Methods: Conduct replicated field trials of the four products across major sugarcane districts to evaluate their potential use as an alternative 'A class' management practice in the sugarcane industry.

Geographic scope: Tully-Murray, Burdekin, Mackay Whitsunday.

Outputs: Results will directly inform the How Leaky? model to improve modelling of pesticides in the GBR catchments & we will be able to both model their comparative environmental fate and risk and demonstrate their efficacy in the industry.





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Water quality benefits of improved herbicide practices in sugarcane

Objective: Determine the water quality benefits of improved practices to reduce pesticide runoff (Shielded sprayers, banded sprayers etc.).

Personnel involved: S. Lewis & A. Davis, JCU; R. Milla, DEEDI and E. Fillols & T. Anderson, BSES.



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Project description

Methods: Conduct replicated field trials of improved management practices in the sugarcane industry and quantify their water quality benefits.

Geographic scope: Tully-Murray, Burdekin, Mackay Whitsunday.

Outputs: Results will directly inform the How Leaky? model to improve modelling of pesticides in the GBR catchments and allow for a more smooth transition for the introduction of more Reef friendly sugarcane management practices within the current RR WQ grants program.





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Use of flocculants to remove pesticides in irrigation runoff

Objective: Demonstrate management options for
minimising off-site movement of colloidal and
dissolved-phase pesticides

Personnel involved: R. Kookana, CSIRO



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Project description

Methods: Conduct field trials to quantify the effectiveness of the use of flocculants to reduce pesticide runoff in irrigated sugar.

Geographic scope: Burdekin.

Outputs: Results will allow for a more smooth transition for the introduction of more Reef friendly sugarcane management practices within the current RR WQ grants program.



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RRRD038: Pesticide dynamics in the Great Barrier Reef catchment and lagoon: management practices (grazing, bananas and grain crops) and risk assessments

Stephen Lewis, James Cook University



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Pesticide half lives and exposure in GBR freshwater and marine waters

Objective: Ascertain the half lives in water and exposure of key pesticides in the Great Barrier Reef catchment area and lagoon

Personnel involved: S. Lewis, A. Davis & L. Glendenning, JCU; A. Negri, AIMS and J. Mueller & K. Kennedy, UQ



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Project description

Methods: Deploy passive samplers in freshwater wetlands of national (ANCA) and/or international (Ramsar) significance throughout the year to examine their persistence in these water bodies. Conduct tank water trials of seawater to examine decay of herbicides over time

Geographic scope: Burdekin.

Outputs: Results will provide a critical measure of pesticide persistence in the GBR catchment area and lagoon, allowing for much improved risk assessments to be made on pesticide exposure in the GBR.



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Tebuthiuron management in grazing lands

Objective: Examine tebuthiuron decay and off site movement in runoff water from grazing lands

Personnel involved: C. Thornton, DERM



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Project description

Methods: Conduct field trials to examine the short and long term fate of tebuthiuron applied within a 17 Ha buffel pasture catchment from the existing long-term Brigalow Catchment Study. The project will examine both granular and liquid formulations of tebuthiuron at the small catchment and plot scale

Geographic scope: Fitzroy.

Outputs: Results will provide data on tebuthiuron half life, movement in soil, and off-site movement to better parameterise models used in the RR M&E component.





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Dissolved and particulate pesticides partitioning and transport from agricultural lands to the GBR lagoon

Objective: Determine the average dissolved and particulate fractions for common pesticides in the Fitzroy River catchment

Personnel involved: B. Packett, DERM



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Project description

Methods: Flood water samples will be analysed over two wet seasons to determine the percentage of chemical bound to suspended sediments and in the dissolved phase at up land and low land sites.

Geographic scope: Fitzroy.

Outputs: Results will provide crucial data for the current water quality modelling projects and assist regional NRM groups and government agencies in identifying catchment hotspots for BMP's and on-ground works aimed at improving GBR water quality.



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Pesticide management in bananas

Objective: Examine management options for pesticide use in bananas

Personnel involved: J. Armour, DERM



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Project description

Methods: Conduct field trials to measure the runoff of pesticides from banana crops.

Geographic scope: Burdekin.

Outputs: Results will provide the first field risk assessment approach for the banana industry and inform the RR Water Quality (WQ) grants program so that growers can make better decisions on their selection of pesticide products. The project will also provide valuable data to better parameterise modelling conducted under the RR M&E component.





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- **Synergies – Reef Rescue & external**

- Paddock to Reef monitoring program (joint sites/objectives)
- Paddock to Reef modelling program (input data requirements)
- NERP projects (Negri et al.)
- Potentially to project Catalyst and the potential Reef Regulation project examining pesticide trapping in vegetation

- **Management Implications**

- Clear recommendations as to whether alternative herbicides and alternative application methods are both production and environment friendly

- **End user engagement & delivery**

- Directly with the sugar industry (& other relevant industries) at all stages
- Directly with Queensland and Federal Government.



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