Band spraying weeds in macadamias in the Burnett Mary region

Background

The Reef Water Quality Protection Plan (Reef Plan), a joint initiative of the Australian and Queensland Governments, focuses on the threat posed by diffuse source agricultural pollution. It is designed to reduce the amount of pollutants flowing into waterways and the Great Barrier Reef in order to build the resilience of the reef to impacts of other stressors.

The Paddock to Reef Integrated Monitoring, Modelling and Reporting (Paddock to Reef) Program measures and reports on progress towards Reef Plan and Reef Rescue goals and targets. Funded jointly by the Australian and Queensland Governments, it is a collaboration involving governments, industry bodies, regional natural resource management bodies, landholders and research organisations.

Paddock monitoring and modelling are important components of the program. This work is funded by the Australian Government’s Reef Rescue initiative with significant support from the Queensland Government. The program conducts paddock trials in various regions in partnership with other organisations to assess the water quality benefits of different land management practices.

About this case study

Managing runoff of agricultural herbicides into the waterways entering the Great Barrier Reef environment is one of the many issues Queensland farmers are addressing. In tree plantation crops such as macadamias, herbicides are used to control weeds along the tree line. Management of weeds on the tree floor, the area immediately beneath the tree canopy, is critical for efficient mechanical harvesting in macadamia farming. Conventionally, the tree floor is kept weed free by applying herbicides uniformly across this area a number of times a year.

Previous studies have shown that precision application (e.g. band spraying) of herbicides is effective in reducing the amount of spray coverage and subsequent transporting of herbicide in runoff. Through the Reef Rescue program, the Burnett Mary Regional Group assisted a macadamia producer’s existing conventional spray rig to WeedSeeker sensors which selectively apply herbicide when weeds are detected. Weed coverage can be sparse at times and a continuous herbicide application, as used in conventional methods, could be unnecessary.

When fitted to the spray boom, the WeedSeeker’s chlorophyll sensing ‘eyes’ effectively control each individual spray jet so that they come on only when the sensor detects a weed. The targeted weed applicator (band sprayer) results in substantially lower herbicide applications leading to better environmental outcomes.

The objectives of this trial were to:
- reduce the potential for herbicide runoff by reducing the amount of herbicide used while still maintaining weed control
- demonstrate that the modified herbicide applicator is economical for horticulture growers.

Key findings

- A precision weed spraying system can reduce herbicide use by 50 per cent and deliver large savings whilst still controlling weeds.
- Reductions in herbicide runoff will contribute to improved water quality draining into the Great Barrier Reef lagoon.

Methods

The project commenced in 2010 and focussed on a group of macadamia farms near Bundaberg, totalling about 700 hectares. It involved the upgrade of a macadamia producer’s existing conventional spray rig to WeedSeeker sensors which selectively apply herbicide when weeds are detected. Weed coverage can be sparse at times and a continuous herbicide application, as used in conventional methods, could be unnecessary.

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Results

The band spraying system reduced herbicide use by 50 per cent in the first year. This in turn could have a significant impact on the amount of herbicide in runoff leaving the farm. In addition, the investment delivered large cost savings in herbicide use, labour and fuel, while maintaining weed control.

The system cost just over $22,000 to buy and install with savings in herbicide costs alone expected to amount to $26,000 per year. With estimated savings on labour and fuel costs, the total savings are expected to be in excess of $40,000 per year. A further positive outcome of band spraying is the environmental benefit associated with reduced herbicide applications.

A 50 per cent reduction in herbicide application is expected to result in approximately a 50 per cent reduction in herbicide runoff losses, based on published studies of the effect of reduced herbicide applications (Masters et al. 2008, 2012; Silburn et al. 2011).

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References

