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FarmLink Research Report 2015

Harvest weed seed control in the Southern region (paddock scale experiment)

Project code – 2015.03.06D

Project Partners



Funding Partners



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Introduction

Research Question - Can harvest weed seed practices be adopted to reduce soil weed seed banks in high yielding HRZ areas of the southern region to address herbicide resistance issues?

A project is currently underway to look at a range of different harvest weed seed capture and pre sowing stubble management practices. Capturing weed seed at harvest is becoming an increasing valuable tool in the fight against weed management and weed resistance management. Growers have been capturing and burning weed seed in windrows via custom made chaff chutes in canola and lupins for a few years now, but new research is aimed at looking for viable weed seed reduction options for cereal crops as well. SFS (Southern Farming Systems lead agency), AHRI (Australian Herbicide Resistance Initiative) along with FarmLink, Riverina Plains and MacKillop Farm Management Group have been tasked with implementing innovative trials aimed at delivering key herbicide resistance management messages to growers, agronomists and consultants to facilitate adoption of weed management tools and encourage crop sustainability.

Trial Design

The projects trial design utilizes small plot and farm scale trials. The small plot trials will be three-way factorial randomized block design to give rigorous scientific data on weed seed collection rates for a range of crop phenology and harvest heights.

The on farm trials will be paddock long strips one header width wide for each treatment. The design will utilize modern precision agriculture (PA) techniques such as yield monitor data, NDVI imagery and photo examination for data collection to provide statistical data for analysis. PA analysis will be done on data generated from the treatment strips. Trials will be established, where possible, in paddocks with historical yield and soil information to further enhance the analysis.

FarmLink is conducting one of the on farm trials which was initiated prior to harvest in 2015. The trial site is located on Mark Bryant's property at Greenethorpe in NSW. There are 3 treatments x 4 reps which are in place at the trial site. They are as follows

1. Blanket burn harvested as high as possible.
2. Weed seed mill harvested at 15cm high.
3. Windrow burn harvested at 15cm high.



Image 1. Treatment 3 Windrow burn harvested at 15cm high.



Image 2. Treatment 2 Weed seed mill harvested at 15cm high.

Methods

A thorough and detailed assessment schedule will be performed at the on farm trial sites which has been summarized in Table 1 below. Sampling of soil weed seed banks, weed counts and herbicide resistance sampling will be undertaken using established methodologies and again analysed to provide statistical rigor. Establishing initial base line weed seed densities, historical yield variability and mapping weed density variations within treatments will be critical to reliable data analysis.

Assessments	Timing	units	Method
Trial planning	pre harvest 2015		
Weed seed bank	pre harvest 2015	weed seeds/m ²	40mm diameter x 5cm deep soil cores
Weed type, numbers & maturity	Just prior to harvest 2015	weed seeds/m ²	Plants/m ² x weed seeds/plant
Harvest efficiency / heights	At harvest 2015	kg/hr, km/hr, L/ha, t/ha	Yield monitor data
Weed seeds	Post harvest 2015	weed seeds/m ²	Plants/m ² x weed seeds/plant
Weed seed bank	Pre sowing 2016	weed seeds/m ²	40mm diameter x 5cm soil cores
Windrow burning + blanket burn	Pre sowing 2016		Timing determined by seasonal conditions, farmer's management schedule
Weed establishment	Post emergence 2016	weeds/m ²	25cm x 25cm quad

Table 1: Assessment schedule for 2015 replicated on farm trials.

Weed seed bank methodology

Soil weed seed banks act as a repository from which weeds emerge to infest crops. Determining initial soil weed seed numbers will provide data on potential weed germinations from the soil in subsequent years. Seed dormancy can be

overcome by extending the period of assessing germinations or implementing a cold temperature treatment that will satisfy species dependent germination requirements. For example, annual rye grass.



Image 3 (above). Ryegrass seed bank germination tray.

Image 4 (right). Pre harvest Weed type, numbers & maturity assessment site.





Image 5. Post-harvest weed seed assessment site.

As an added demonstration for the Harvest weed seed trial site FarmLink were fortunate to engage the services of Jamie Wright owner of Springfield Chaff Carts (www.springfieldgrenfell.com.au) to put in two demo runs alongside the trial. Chaff carts are an alternative method of weed seed capture which are popular in WA and becoming more popular in eastern states.



Image 6 & 7. Springfield Chaff Cart.

Results

Results are currently being compiled and analysed and presented to project leaders for scrutiny and will be available for release prior to planned field day and paddock inspections pre sowing.