

GRDC Regional Cropping Solutions Network

Report Structure for Final Reports

Introduction: Threshold and cost of hand weeding low density wild radish

For some growers it is not 10m or 100m between wild radish plants this year, it is a 10 minute drive between plants. These growers have extremely low radish numbers in crop because;

- They have smashed the seed bank for 10 years or more with IWM,
- They got a good knockdown on radish
- The crop was sown onto moisture with little follow up rain to germinate weeds.

But the last few radish are costing a fortune to control. Even though they are few in number, the growers still find themselves blanket spraying the whole paddock with expensive herbicides because they don't want to undo the hard work that they have put into their low seed bank.

Objectives

Develop a crop monitoring technique to assess wild radish density and provide growers with an estimated cost of hand weeding for a range of wild radish densities.

Assess the efficacy of hand weeding of wild radish using backpacker labour.

Trial locations

Paddock	Area	Lat	Long
Critch 1	10.5 ha	-28.615145	115.340739
Critch 2	80 ha	-28.614917	115.352017
Messina 3	9.6 ha	-28.567327	115.479991

Methodology

Step 1: Assess

Three paddocks were assessed in August by driving 1 to 1.2km at 10 km/h through tillering wheat crops and visually assessing an area 3.5m either side of the vehicle. This was done by driving down a spray tramline with a person on either side of the vehicle looking out of the window.

Step 2: Find some backpackers

An advert was posted on the jobs board at the local backpackers in Geraldton and we had our hand weeding team a few hours later. Backpackers get a 1 year visa. If they do 88 days of agriculture related work in that year they can apply for a second year. They are hungry for the work.

Stuart McAlpine from Buntine has used Gumtree to advertise for backpackers to hand weed radish in recent years. He regularly receives 100 to 150 responses to his ads. His tip – don't leave your mobile phone number on the ad, the thing won't stop ringing!

Step 3: Drop the backpackers in a big crop and tell them to pull out the weeds.

We supplied them with a vehicle, hat, long sleeves, gloves, plenty of sunscreen, water, Aeroguard, and \$25/hour. Wild radish with large pods were removed entirely from the paddock. Wild radish with only flowers and immature (pencil lead) pods were pulled out and left in the crop.

The team of three worked together with a driver and two pickers. They drove down boomspray tramlines and walked into the crop from there to remove radish. The team counted wild radish on each transect that they weeded providing excellent special data.

Results

Three paddocks were hand weeded.

Assessments of each paddock were made on 14 and 15 July 2015 to estimate the approximate density of wild radish per hectare.

Table 1: Estimated wild radish density per hectare as assessed on 14 & 15 July compared to actual wild radish density counted during hand weeding.

Paddock	Distance driven in crop	Radish count per 7m x distance driven	Estimated radish density /ha	Actual radish density/ha
1	1km	7	8	26
2	1.2km	1	1.2	2.3
3	1.2km	26	31	97

Our assessment of paddock 2 was relatively accurate and this was a good result. In paddock 1 there was an area of high wild radish density near a fence which made the early assessment inaccurate resulting in high cost and poor time efficiency. In paddock 3, the transect that was assessed turned out to be accurate. The estimated density of that transect was 31 radish/m² and the actual density was 37 radish/m². However, the rest of the paddock was much weedier than this transect, hence the difference between the early assessment and the actual radish density.

Table 2: Wild radish number, density, time spent weeding, area weeded per hour and estimated cost/ha for hand weeding of three separate paddocks near Mullewa in 2015.

Paddock	Area	Number of Wild Radish	Wild radish /ha	Time spent weeding	Area weeded / hour	Cost / ha
1	10.5 ha	275	26	5.5 hours	1.9 ha	\$39
2	80 ha	182	2.3	5.5 hours	14.5 ha	\$5.15
3	9.6 ha	930	97	6.5 hours	1.5 ha	\$51

Discussion of Results

End result – hand weeding wild radish is feasible if you can pick the right paddock with a low enough weed density. The trick is picking the right paddocks!

The wild radish in the northern cropping region of WA is extremely resistant, but in most cases the crops are now very clean. Most growers have targeted the radish seed bank for a decade or more through crop and herbicide rotation, robust herbicide mixes, narrow windrow burning, and the attitude that wild radish should never be allowed to set seed.

Most growers say the same thing, ‘my radish numbers are low, but the last few radish are costing me a fortune to control’.

The growing conditions were perfect for low radish numbers in crop near Geraldton in 2015. Lots of summer rain providing a good knockdown and early seeding opportunity followed by dry conditions in May to limit radish germination in crop.

Implications

We are hearing speculation that weed detection in crop is just around the corner – but we are ready for it now! This project aimed to determine if hand weeding is a viable option while we wait for weed detection technology. This project made two important observations;

1. Some paddocks now have a wild radish seed bank low enough to justify economical hand weeding.
2. Weed detection technology will be very useful in the future to reduce the cost and time requirement of weed control while at the same time improving the ability to kill hard to control weeds through the use of a robust herbicide brew of several products or a non-herbicide tool.

Recommendations

1. This is a viable practice where wild radish density is approximately 5 to 10 plants / hectare or less. At very low densities this practice is both economically and logistically feasible.
2. A side by side all terrain vehicle (ATV) with a trailer would be ideal. With this equipment, teams of two could work together with the driver picking radish given the ease of stepping into and out of these vehicles. This would reduce the cost and make life easy and safe for the workers.
3. Spray a boundary lap and any areas where high density is expected. We encountered high radish densities near the edges of paddocks which slowed down the process and increased the cost. These sprayed areas can also be hand weeded to remove resistant survivors.
4. Spend time assessing the paddocks. We managed to make accurate wild radish density assessments in one paddock. The problem was that we didn't do enough assessment and we were faced with surprises in the other two paddocks.
5. Drones /weed detection will have their day. We have un-sprayed paddocks that now have as few as 2 wild radish per hectare in crop. It is simply not worth spending upwards of \$25/ha to spray these crops not to mention the environmental issues. These paddocks are currently rare but they show what is possible.

Appendices

Communication activities

ABC Radio Interview with Lucinda Jose

GRDC Driving Agronomy podcast interview with Chris Brown

Edition of AHRI insight sent to 2700 subscribers

Paper for Perth Crop Updates 2016

Presentation at Perth Crop Updates 2016

Twitter campaign during and after hand weeding.

Mentioned in presentations at Adelaide Crop Update, Auburn, SA Crop Update, Landmark agronomy conference, AgnVet agronomy conference, Landmark Wongan Wills grower update, and Nyabing grower update

Including communication and extension activities, events and attendances

References

Plain English Summary

Project Title:		Threshold and cost of hand weeding low density wild radish				
GRDC Project No.:						
Researcher:		Peter Newman				
Organisation:		Planfarm				
		PO Box 2437, Geraldton, Western Australia, 6530				
Phone:		08 9964 1170				
Fax:		08 9964 1142				
Email:		petern@planfarm.com.au				
Objectives		Develop a crop monitoring technique to assess wild radish density and provide growers with an estimated cost of hand weeding for a range of wild radish densities. Assess the efficacy of hand weeding of wild radish using backpacker labour.				
Background		Some grain growers now have extremely low wild radish numbers in crop because they have smashed the seed bank for 10 years or more with integrated weed management (IWM), but the last few radish are costing a fortune to control. Even though they are few in number, the growers still find themselves blanket spraying the whole paddock with expensive herbicides because they don't want to undo the hard work that they have put into their low seed bank.				
Research		In this short term project funded by GRDC through the Geraldton RCSN, we set out to develop a technique for assessing the wild radish density at which hand weeding was more economical than spraying. Three paddocks were hand weeded by a team of three backpackers.				
		Paddock	Area	Wild radish /ha	Area weeded / hour	Cost / ha
		1	10.5 ha	26	1.9 ha	\$39
		2	80 ha	2.3	14.5 ha	\$5.15
		3	9.6 ha	97	1.5 ha	\$51
Outcomes		End result – hand weeding wild radish is feasible if you can pick the right paddock with a low enough weed density. The trick is picking the right paddocks!				
Implications		We are hearing speculation that weed detection in crop is just around the corner – but we are ready for it now! This project determined that hand weeding is a viable option for some growers and that detection technology will be a very useful tool for grain growers in the future.				
Publications		‘Hand weeding of wild radish – sometimes cheaper than spraying’, Peter Newman, Planfarm, Perth Crop Updates 2016				