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# Integrated weed management controls wild radish

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## Key messages

- After seven years of IWM including the use of the integrated Harrington Seed Destructor (iHSD), the Harringtons are controlling their wild radish numbers on paddocks that previously had high densities on their farm located near Darkan.
- Between 2018 and 2020 the radish population was reduced by 71%.
- An integrated weed management approach was used incorporating iHSD, herbicide, hand picking, crop rotation and early grazing opportunities

## Background to the activity

Harvest weed seed control (HWSC) is an important option in the integrated weed management (IWM) toolbox for managing in-crop weeds. Research conducted by the Australian Herbicide Resistance Initiative (AHRI) indicates that annual ryegrass, wild radish, wild oats and brome grass all had high proportions (70%+) of total seed production above harvest cutting height (15cm) at the beginning of a wheat crop harvest (Walsh, 2013). Different techniques are available to reduce the weed seed returning to the seedbank by managing what happens to the seed as it is processed by the harvester, including options such as narrow windrow burning, chaff carts and seed destructor technology. Research by AHRI found that the integrated Harrington Seed Destructor (iHSD) can destroy >99% (+/- 0.1) of brome grass and wild oat seeds, >95% (+/- 0.8) of ryegrass seeds and >93% (+/- 2.6) of wild radish seeds that pass through the harvester.

After seven years of IWM including the use of the iHSD the Harringtons are controlling their wild radish numbers on paddocks that previously had high densities on their farm located near Darkan. The Harringtons run a mixed farming enterprise of both cropping and sheep. The paddock monitored was sown to canola in 2016, barley in 2017, barley in 2018, canola in 2019 and wheat in 2020. Cropping paddocks on their farm are kept separate from pasture paddocks. The Harringtons are interested in winter wheat for early grazing opportunities to reduce pressure on pasture paddocks to allow them to further bulk up for grazing later in the season as well as help with early weed control.

## Aim

This activity was designed to monitor how wild radish populations change when a range of IWM methods are used and to investigate the economic advantages to spraying verses hand weeding.

## Methods

Mapping was conducted by walking strategically up and back with the crop rows and marking any radish plants using mapping program GIS. Mapping of wild radish in this paddock (10.7ha) was initially done in 2018 when the paddock was planted to barley. Once the wild radish was mapped it was pulled out by hand to stop seed set. In 2019 the paddock was planted to Roundup Ready canola GT53, and was not mapped due to not being able to successfully locate wild radish in this crop type. Glyphosate was sprayed over the paddock by plane in a mix with insecticide for budworm late in the season. The crop was swathed prior to harvesting.

Canola stubble was grazed by sheep over the 2019/2020 summer until the knockdown application on the 23 April 2020 of paraquat at 2L/ha. The paddock was then planted to a long season red winter wheat, RGT Accroc. A broadleaf herbicide application of MCPA 300mL/ha + Bromoxynil 500mL/ha occurred on 10 June. The paddock was remapped in September 2020 and wild radish weeds were counted. Other weeds found in this paddock were cape weed, wild oats and ryegrass.

## Results and discussion

There were 182 radish plants counted in the paddock from the 2018 radish map (16.8 plants per hectare) located throughout the paddock as single plants and in clusters at various sizes (Figure 1). The radish plants were found typically in old chaff rows.

Figure 1. The range of size of the radish plants found in the paddock in September of 2020.

Based on 2.5 hours of labour for 2 people (@$25/hr) to handpick 180 wild radish plants (the population in 2018), total cost of this would equate to a $125 spend. In 2020 52 plants were found in the paddock (4.8 wild radish plants per hectare) as both individual

plants and clusters of plants. The wild radish population has decreased from 2018 compared to 2020 with a 71% reduction in the number of plants (Figure 2).

The combination of the ongoing use of iHSD, handpicking in 2018, 2019 crop topping, 2020 early grazing, April knockdown and post-emergent broadleaf spray has reduced wild radish numbers. In 2020 counts there were fewer single plants and fewer clusters. The grower noted that grazing of the canola stubble over the 2019/2020 summer potentially reduced the efficacy of the in-season broadleaf spray in 2020 as wild radish plants were too small for good leaf contact.

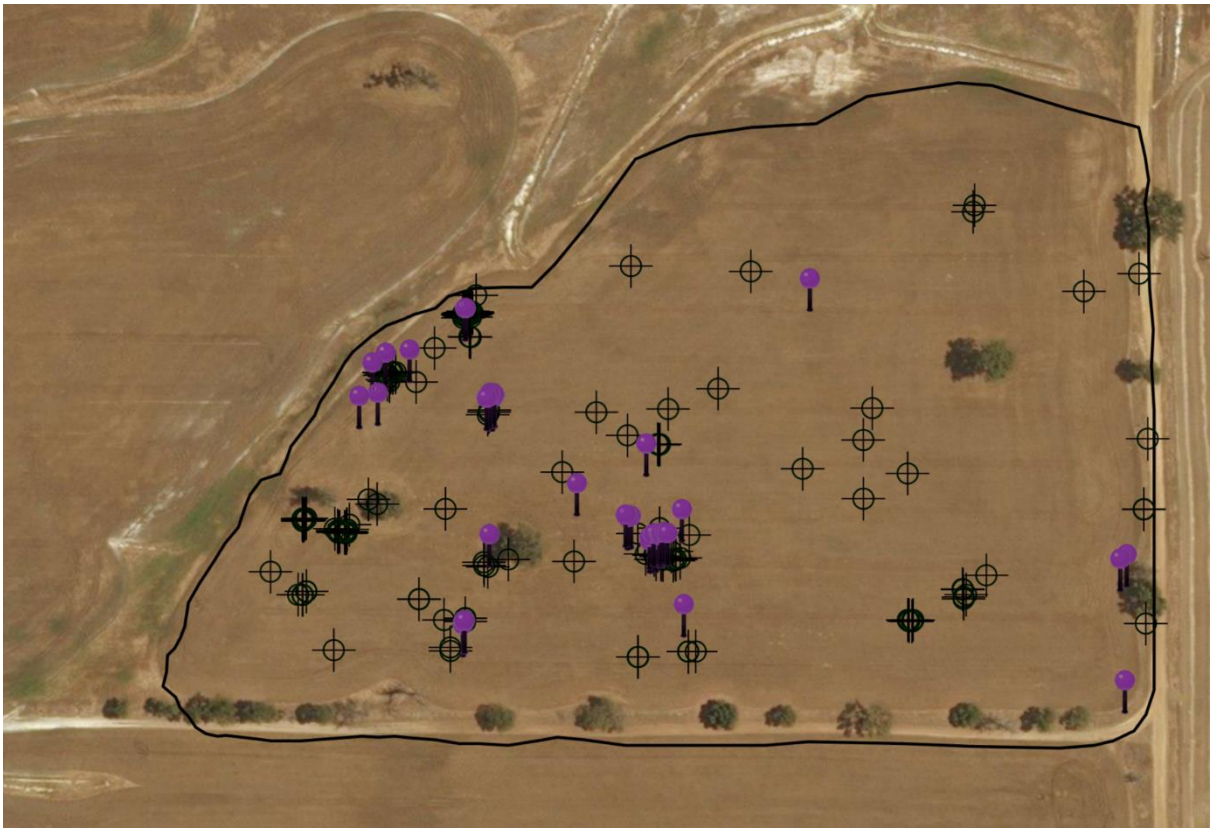

Figure 2. The combined location of wild radish found in the paddock in 2018 (black icons) compared to 2020 populations (purple pins).

The use of a long season winter wheat and the potential for early grazing could also be a management tool for reducing the wild radish population as well as other weeds found in this paddock such as cape weed. However, RGT Accroc is too long and not suitable for the area as the there was no canopy closure in September which is a useful tool to block out sunlight and nutrients to the wild radish plants. Another winter wheat variety, such as Illabo, with a shorter maturity might be more suitable for this purpose.

## Conclusions

The 71% reduction in wild radish plants is a positive outcome from the IWM practices used on this paddock. The continual use of the iHSD in conjunction with summer grazing, a knockdown and a post emergent radish spray will continue to deplete the wild radish seed bank over the next few seasons. The population is now at a low enough level that a cheaper and well timed broadleaf spray will have good efficacy. Planting a cereal that is very competitive and has early vigour will also help in further reducing the wild radish population.

New technology such as green on green spray technology could assist in the future to target plants that make it through the iHSD. Other technology such as drones will be useful for mapping paddocks to provide a spray map to help farmers make more informed decisions on how much chemical will be required. This could reduce chemical costs and make spraying more economical than the hand picking option.

## Acknowledgements

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## Important disclaimer