Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

GRDC GRAINS RESEARCH & DEVELOPMENT CORPORATION

Long term integrated weed management maintains low weed numbers for two decades

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Key messages

- Results from a two-decade annual survey continue to show the success of integrated weed management strategies in controlling ryegrass weed numbers in 27 paddocks in the Geraldton port zone.
- Growers in the study continue to manage herbicide resistance and have reduced weed numbers by over 99% since 2001.
- Once ryegrass numbers were markedly reduced, farmers including harvest weed seed control (HWSC) in their regime have consistently kept weed numbers close to zero, while those without have experienced more volatility.

Background

Monitoring of a series of focus paddocks began in 2000, when high levels of herbicide resistance in annual ryegrass were becoming a serious problem for many farmers in the Geraldton area, and continued over several years through support of two DAFWA-GRDC projects (DAW672 and DAW0123). Weeds researcher Peter Newman worked with four small groups of growers in the northern wheatbelt, at Mullewa, Mingenew, Yuna and Coorow, who were concerned about resistant weeds and were motivated to manage them through a range of innovative approaches other than herbicides alone. In 2001, the average ryegrass count across the paddocks was 183 plants/m^2 and growers reduced these numbers by an average of 98 per cent over the first nine seasons. Monitoring of surviving ryegrass populations in the focus paddocks has continued in spring each year, with the Regional Agronomy project team (DAW00256) conducting this activity since 2017.

Method

A ryegrass weed count of 20 x 0.1 m^2 quadrats at the designated site in each of 27 focus paddocks was conducted during the period 25 August to 5 October 2020. Weeds counted represent the surviving ryegrass in crop (or pasture) at that point in time rather than a measure of the total weed seedbank. All paddocks were in crop this year. Growers' herbicide regimes and use of harvest weed seed control methods were also collected.

Results and Discussion

The average number of ryegrass weeds across most paddocks was very low and, apart from a 'blowout' in one wheat paddock at Yuna, ranged from 0–28 plants/m^2, a 99% reduction since the start of the study in 2001.

The focus paddocks were grouped according to whether the growers used harvest weed seed control (HWSC) methods. 'Plus HWSC' was defined as paddocks where HWSC was used in at least four years over the study period. Averaged ryegrass counts for paddocks with and without HWSC are shown in figure 1.

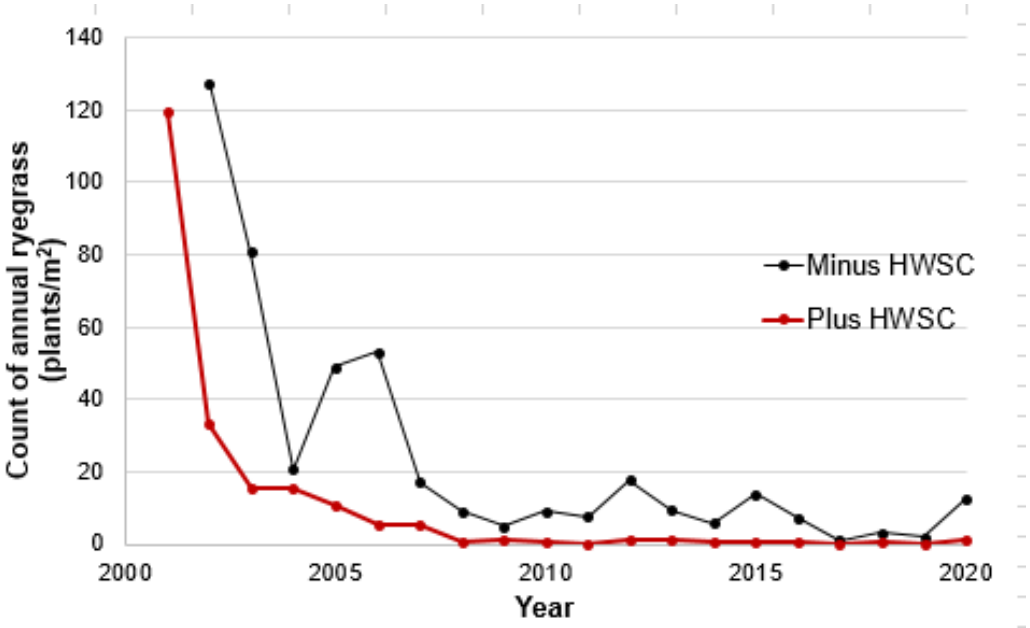

Figure 1: Averaged ryegrass counts for paddocks with harvest weed seed control (Plus HWSC), shown in red, and Minus HWSC (black). There were 13 paddocks averaged in the 'minus' group, and 14 in the 'plus' group. Note: The peaks in 2000–2002 were left out in order to provide a scale which highlights the differences in later years.

Paddocks where HWSC was adopted were, on average, much more successful at keeping near-zero levels of weeds, but by 2017 weed numbers were similarly low for both groups. In 2020, weed numbers in the 'plus HWSC' paddocks were less than 1 plant/m^2 but in the 'minus HWSC' paddocks weed numbers had increased slightly (11.6 plants/m^2) from the previous three seasons. This increase may be attributable to the exceptionally strong wind event which occurred in late May.

Conclusion

Over the past 20 years growers have successfully used a suite of IWM practices to drive ryegrass weed numbers down and prevent further development of herbicide resistance. Examples are the double knockdown; rotation of herbicide groups to slow down the build-up of herbicide resistance; and the mixing of herbicides in a single application to further prevent resistance. Other strategies include crop-topping, crop rotation, chemical fallows, grazing management, mouldboard ploughing, and crop competition.

Once the weed numbers were under control in the first few seasons, some growers added harvest weed seed control methods such as chaff carts, narrow windrow burning, chaff lining, chaff dumps, and more recently, seed mills such as the Harrington Seed Destructor.

In the 2020 season, growers' IWM strategies have continued to keep weed numbers low in most paddocks with slightly higher numbers in the 'minus HWSC' paddocks

For further information refer to Harvest weed seed control shows continued success in controlling resistant weeds on the DPIRD website.

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