2024

Weed Seed Wizard scenario - herbicide resistance in wild oats in Wagga Wagga, New South Wales

Department of Primary Industries and Regional Development, Western Australia

Weed Seed Wizard scenario

Wagga Wagga, NSW - herbicide resistance in wild oats

This New South Wales scenario is set in Wagga Wagga between 2008 and 2010 and is a barley - canola - wheat rotation with wild oats and a few annual ryegrass.

In the original scenario, all herbicides are working and there is no harvest weed seed management (all chaff is spread out the back of the header). See Table 1 below for management events. In the modified scenario, wild oats have almost complete resistance to clethodim (Select™, a Group 1 herbicide) which was sprayed once on 15/06/2009.

Table 1 Management events for Wagga Wagga, New South Wales (2008-10)

Date	Management events for the original and modified scenarios
18/04/08	Spray: Glyphosate 450
23/04/08	Sow: Barley, disc seeding
23/04/08	Spray: Trifluralin
22/05/08	Spray: Axial (pinoxaden)
11/12/08	Harvest: Barley harvested, 2.3 t/ha of potential yield, all chaff spread/normal harvest used
12/04/09	Spray: Glyphosate 450
11/05/09	Spray: Sprayseed/Trifluralin
12/05/09	Sow: Canola, disc seeding

15/06/09	Spray: Select (clethodim)
10/11/09	Harvest: Canola harvested, swathing used
14/04/10	Spray: Glyphosate 450
24/04/10	Spray: Trifluralin
24/04/10	Sow: Wheat, disc seeding
24/06/10	Spray: Atlantis (mesosulfuron)
11/11/10	Harvest: Wheat harvested, 3.4 t/ha of potential yield, all chaff spread/normal harvest used

What happens when wild oats develop resistance to clethodim?

In the first scenario (Figure 1 - left and Figure 2 - top), there is no herbicide resistance in wild oats, and it is controlled well. There is a reduction in yield in the canola rotation due to the dry season and late sowing (shown by the red bars - with weed competition).

In the second scenario, (Figure 1 - right and Figure 2 - bottom), the wild oats have almost complete resistance to clethodim (Select™, a Group 1 herbicide) but is susceptible to all other herbicides. There is a substantial decrease in the canola yield, followed by a reduction in the wheat yield in the following season (shown by the red bars - with weed competition).

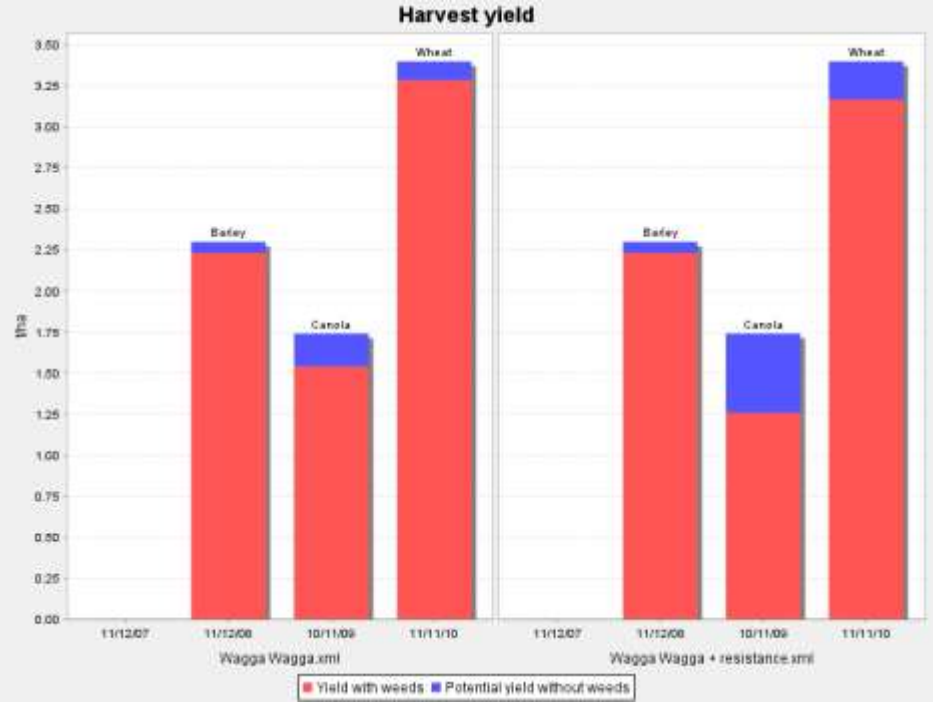

Figure 1 Weed Seed Wizard crop yield simulation of 2 scenarios in Wagga Wagga, New South Wales: one with all herbicides working; and one with clethodim (Herbicide Group 1) resistance in wild oats. Crop yields with weeds (red) and potential crop yields without crop competition (blue)

By looking at the plant numbers of wild oats (Figure 2) in the 2 scenarios, you can see there are more wild oat plants at the canola harvest in the scenario with clethodim resistance. This led to more seed set and more wild oat plants in the wheat rotation.

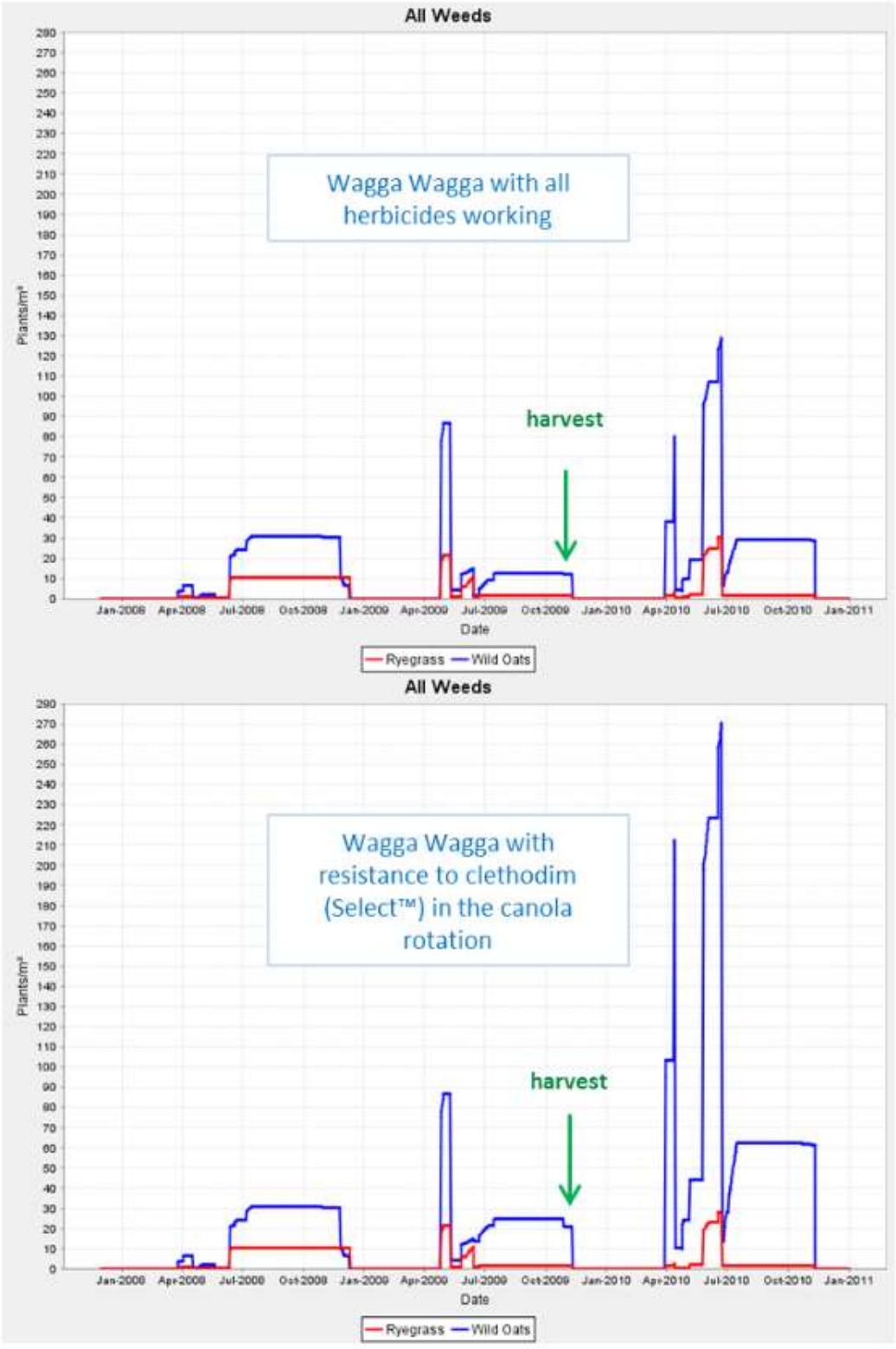

Figure 2 Weed Seed Wizard plant numbers for two scenarios in Wagga Wagga, NSW: one with all herbicides working (top); and one with clethodim (Herbicide Group A) resistance in wild oats (bottom).

What can you do once wild oat is resistant to clethodim?

There are many integrated weed management techniques that can be used and are available in the Weed Seed Wizard. These might include:

- rotating herbicides (after doing a resistance test on the wild oats to determine which herbicides still work)
- increasing crop seeding rates for greater crop competition
- changing the crop rotation with different herbicide modes of action
- having a fallow year
- having a pastures phase with grazing
- changing the time of sowing and herbicide application
- using harvest weed seed management, for example, a chaff cart.

For more information see the Integrated Weed Management in Australian cropping systems manual and discover how they may fit into your farm.