

# Using barley cultivar choice and herbicides for wild oat control

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## AT A GLANCE....

- Wild oats are a problematic weed species in barley.
- Avadex Xtra 3.2 L/ha very effectively reduced wild oat biomass and helped in improving barley yield.
- The barley variety Commander reduced wild oat biomass much more than LaTrobe. Plots treated with Boxer Gold 2.5 L/ha and Sakura 118 g/ha, respectively.

**I**N the northern grain region (NGR), wild oat infest an estimated 600,000 hectares and cost growers around \$4.5 million each year in control costs and yield loss.

Wild oat possesses prolific seed production and outcompetes winter cereals. One individual plant of wild oat can produce around 400 seeds; but, fecundity is highly plastic and varies with crop competition and environmental conditions. Although wild oat seeds have a short lifespan in the soil seed bank, its high seed shattering tendency and regular reinfestation in the field through seed rains, maintain its seed bank viability.

Barley is frequently hindered by wild oat infestation. Literature suggests that 70 to 80 wild oat plants per square metre may cause

a 60 to 70 per cent yield loss in barley if not controlled. Besides this, wild oat infestation could deteriorate the malt quality of barley. And if wild oat is not contained, its fresh seed could revive the weed seed bank in the soil.



**Commander (left) was a better competitor than LaTrobe.**

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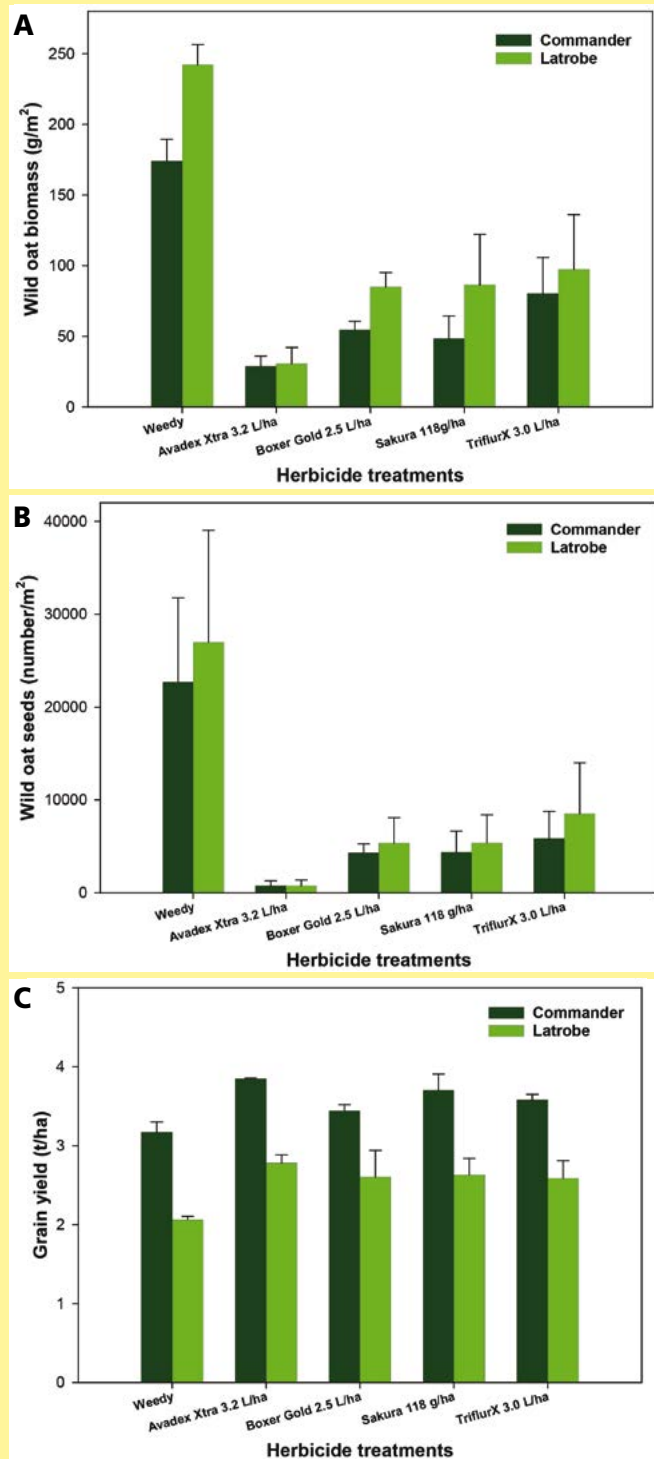


## Resistance to Group A herbicides

Recent survey reports in the NGR have revealed that wild oat has developed resistance to Group A herbicides. This means limited options of post-emergent herbicides are available for chemical control of wild oat in barley.

Management strategies are needed for control of wild oat in barley in order to delay the problem of herbicide resistance and prevent the production of new seed.

**FIGURE 1: Effects of cultivars and herbicides on wild oats – A) biomass (g/m<sup>2</sup>); B) seed production (number/m<sup>2</sup>); and, C) grain yield of barley**



(Error bars indicate plus or minus standard error)

Enhancing crop competitiveness by exploiting weed competitive cultivars is one of the important components of integrated weed management that helps in combating herbicide resistance and reducing weed seed production. We hypothesised that competitive cultivars of barley may increase the effectiveness of herbicides for wild oat control and subsequent yield improvement.

## How the research was done

A trial was conducted in the winter season of 2019 (May to October) at the Gatton Research Farm of the University of Queensland to evaluate the effectiveness of different herbicides in combination with two barley cultivars for the control of wild oat and its impact on yield.

Ten treatments comprising two cultivars (Commander and LaTrobe) in main plots and five herbicide treatments (non-treated control, Avadex Xtra 3.2 L/ha, Boxer Gold 2.5 L/ha, Sakura 118 g/ha, and TriflurX 3.0 L/ha) in sub-plots were arranged in a split-plot design with three replications.

Wild oat seeds (40 seeds per square metre) were mixed with sand and spread uniformly in the field before land preparation.

The crop was sown with a precision planter at 125 seeds per square metre at 35 cm row spacing on May 8, 2019. The experiment was irrigated using a sprinkler system immediately after sowing and thereafter, irrigated as per the requirement to maintain the soil moisture at field capacity.

Herbicides were applied as pre-emergent immediately after sowing of the crop. Urea fertiliser at 150 kg per hectare was applied in the field before sowing.

Weed biomass was determined by cutting all the aboveground plant material at the soil surface from two, 0.25 square metre areas in each plot. The crop was harvested on October 23 2019 and grain yield was recorded at 12 per cent moisture content.

## What we found

Among herbicide treatments, Avadex Xtra 3.2 L/ha provided superior weed control in terms of weed biomass reduction when compared with other herbicide treatments (Figure 1A).

Commander reduced weed biomass by 28, 35 and 48 per cent compared with LaTrobe in the non-treated control, Boxer Gold 2.5 L/ha and Sakura 118 g/ha treatments, respectively (Figure 1A).

Commander and LaTrobe under each herbicide treatment behaved similarly for wild oat seed production. But each herbicide treatment reduced wild oat seed production significantly compared with the non-treated control (Figure 1B).

Averaged over cultivars, wild oat produced 24,850 seeds per square metre; but, with the use of Avadex Xtra 3.2 L/ha, seed production reduced to 760 seeds per square metre.

The grain yield was higher in Commander compared with LaTrobe in all herbicide treatments; but, yield differences between cultivars were highest in the non-treated control (Figure 1C).

Avadex Xtra 3.2 L/ha resulted in a 19 and 35 per cent increase in yield when compared with the non-treated control for Commander (3.2 t/ha) and LaTrobe (2.1 t/ha), respectively.

## To sum up

Our results suggest that Avadex Xtra 3.2 L/ha effectively reduced the biomass and seed production of wild oats and helped barley yield. This study also suggests that the effectiveness of Boxer Gold and Sakura for reducing the biomass of wild oats can be increased by using weed-competitive cultivars such as Commander.

Further studies are needed to assess how such weed-competitive cultivars can be best exploited with other agronomic practices (narrow row spacing, tillage practices and sowing time, etc.) for judicious use of herbicides and for delaying the problem of herbicide-resistant weeds in different crops.