Weed Competitiveness of Barley Varieties

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Take home messages

- Using competitive varieties as a form of weed control is becoming more important
- Fathom, Maritime and Compass are seen as some of the best varieties in terms of weed competitiveness
- Growers should select varieties for different paddocks depending on their weed history
- Competitive varieties are another tool in the fight to reduce weed seed banks

Why complete this work?

Sowing dates are trending earlier and many growers are now sowing dry in mid-late April. Chemicals can be less effective during this time due to less weeds being able to be killed with a knockdown, which leads then to more pressure on control using pre-emergent and post emergent chemicals.

A crop with good early vigor and ability to establish before the weeds and shade out the weeds, especially in dry sowing conditions, should increase yield and also play an important role in integrated weed management systems as can be seen in the diagram below. Varieties differ in their growth characteristics with some having erect leaves, low early vigor and fewer tillers which allow more light into the canopy, while others have more tillers, high early vigor and larger leaf area which allows less light into the canopy. Restricting light into the canopy should result in less light being available for weeds growth. As varieties differ in growing patterns this work has been completed to determine which varieties perform better under high weed pressure situations to see if their yields are affected as well as their ability to restrict weed seed set.
How has this been done?

**Plot Size:** 1.75 m x 5m  
**Fertilizer:** 70kg of DAP  
**Seeding date:** 19th of May 2014  
**Varieties:** Scope, Grange, Compass, Maritime, Navigator, Hindmarsh, Commander, Skipper, Fathom, Wimmera, Moby and Mace wheat.

The 2014 trial had 9 different commercial barley varieties and Mace wheat. All varieties had 6 replications with 3 of these planted with oats to simulate weed competition. These were planted before the barley with some being below the ground and others being above to resemble a normal seed bed.

A similar trial was conducted at Karoonda in 2013 and it is important to repeat these trials as they tend to have a high degree of variability depending on the season.

**Results**

The 2014 trial was heavily affected by frosts, as the trial was in a low point of the paddock. Even with frost, results similar to the 2013 trial were achieved. Figure 1 has two years of combined data and shows that, in general, varieties which had a higher level of competitiveness (i.e. able to suppress weed seed set) were also those which suffered the least yield loss in the presence of weeds (i.e. tolerance to weed competition). These included Compass, Fathom and Maritime.

**Figure 1** The effect of barley variety on oat seed yield (seed/m²) when oats are under sown as a weed and grain yield loss (expressed as % of trial average yield) when oats is under sown as a weed at 70 plants/m² – *Karoonda MSFS site 2013-2014*

(Oat seed per m² LSD = 300, Yield loss LSD = 13.5%)
All three of these varieties tend to have a plant type that is more spreading compared to a variety like Hindmarsh which has a very erect plant type. Due to the more erect plant type, more light is able to get into the canopy and as a result give the weeds a chance to get away. Mace wheat is also similar to this and also showed limited oat suppression however its yield was not affected as much as barley. This could be due to a number of reasons however, it does suggests that wheat has better stress coping abilities than barley when under weed pressure.

**Figure 2** NDVI values from Karoonda trial site on July 30th 2014

NDVI values give a reading of how much ground cover and biomass is in a crop. The higher the value means there is less ground not covered by the crop. As can be seen the varieties such as Fathom and Maritime which performed well in figure 1 for weed suppression also have higher NDVI values. This shows that producing earlier biomass and covering bare ground means these varieties can compete with weeds and reduce their impact. As can also be seen Mace and Hindmarsh, which performed poorer than others in reducing weed seed set, also had lower NDVI values which show they do not cover the bare ground within the crop as well as other varieties.

**Conclusion**

Varieties differ in their ability to perform under weed pressure. Some are excellent at suppressing weeds and reducing seed set while others are not. When season planning occurs, paddocks with high weed numbers in the past may be better suited to a more competitive variety. This then allows you to save your other varieties such as Hindmarsh and wheat for cleaner paddocks. As mentioned, choosing a competitive variety can play an important role in a weed management system.