3.3.3 Barley variety trial - Lake Bolac, Vic

Location: SFS Lake Bolac Research Site

Funding:
This was an SFS Streatham Branch Funded Trial

Researcher(s):
Southern Farming Systems

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Thanks to Neil Vallance for providing the land for this trial

Summary of findings:

- The trial yielded an average of 6.4t/ha for the 2011 season, which closely matched the potential yield of 6.39 t/ha based on growing season rainfall.
- The highest yielding variety were the feed cultivars with Oxford topping performance at 7.6 t/ha.
- The popular malting variety, Gairdner, was lowest ranked in this trial at 4.84 t/ha.
- The 2011 season has highlighted the financial cost of the yield penalty that can be experienced when growing malting varieties.

Background/Aim:
To evaluate a range of commercially available varieties. These reflect the most widely grown varieties in the area and include others that may be considered in the future. They include a number of different grades, reflecting market options in Southern Victoria.

Rainfall:

2011 Total:	595 mm
Avg. Annual:	540 mm
2011 G.S.R.:	347 mm
Avg. G.S.R.:	400 mm

Paddock History:

2009:	Barley
2010:	Wheat

Soil Characteristics:

Soil Type:	Brown clay loam
pH (1:5 CaCl):	6.6
Deep N (kg N/ha):	49.9
P (Colwell) (mg/kg):	44
K (Colwell) (mg/kg):	460
Organic Carbon %:	1.9

Yield Potential: The Water Limited Yield Potential (WLYP*) for this trial was 6.39t/ha.

*WLYP: Calculated using WUE values of 15kg/ha per mm rainfall for Wheat/Barley and 7kg/ha per mm rainfall for Canola, 130mm assumed evaporation and GSR of 30% Jan & Feb + 50% Mar (only if >20mm) + April to November. This calculation makes an allowance for a % of stored moisture from the summer

Variety: Various

Sowing rate: Aiming to establish a target population of 180 plants/m^2

Sowing date: 1-Jun-11

Harvest date: 15-Dec-11

Plot size: 10m x 1.45m x 4 reps.

Plot type: Flat

Fertiliser:	1-Jun-11	MAP 100kg/ha
	6-Sep-11	Urea 150kg/ha
Herbicides:	1-Jun-11	Roundup PM 1.5L/ha
	1-Jun-11	Boxer Gold 2.5L/ha
	27-Jul-11	Axial 400ml/ha
		Precept 500ml/ha
		Adigor 500ml/ha

Fungicide:	1-Sept-11	Prosaro 0.15L/ha Hasten 1%
	5-Oct-11	Prosaro 0.15L/ha Hasten 1%

Measurements: Cultivar yield is the primary component to be measured in this trial; however protein and screenings have also been measured in line with commercial practices.

Diseases: Early on in the season some net form of net blotch (NFNB) was seen on susceptible barley varieties. There was also a little scald and stem rust, but the dry spring reduced the disease Pressure

Tillage type: The trial was sown with the new SFS cone seeder on 20cm row spacing's using 2.5cm knifepoints. Stubble burnt prior to sowing.

Results and discussion:

The trial yielded an average of 6.4 t/ha for the 2011 season. Oxford was the highest yielding variety at 7.6 t/ha or 119% of the site mean and Gairdner was the lowest variety at 5.79 t/ha or 76% of the site mean. Westminster, Capstan and Hindmarsh yielded equal to or above the site mean, whereas Commander performed below the site mean yield (see graph 1 below).

Hindmarsh yielded 0.44t/ha better at Lake Bolac compared to Inverleigh. This may be explained by the drier finish to the season at Lake Bolac which was more suitable for shorter season length varieties.

Graph 1. Yield difference when compared to the site mean (6.4t/ha)

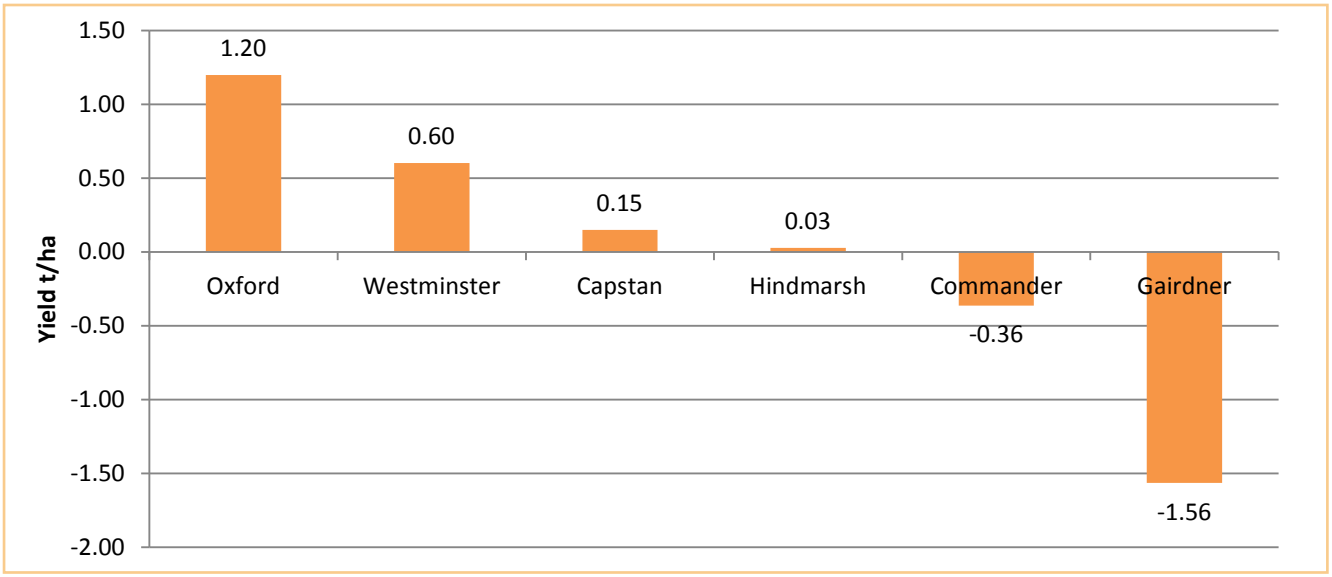


Image 1. Gairdner barley at Lake Bolac

In discussing the proteins, Hindmarsh attained the highest at 12% and was significantly different to both Westminster and Commander. Because these two varieties achieved relatively low protein levels there is a suggestion that there has been some potential yield left out in the paddock. Certainly for Westminster, a feed variety with malting potential, an increased N regime may have resulted in higher yields without compromising end market value. However with Commander, as is always the way when aiming for malting premiums, increasing N applications for yield gains can be risky when considering you do not want to blow your protein levels.

Besides over-application of N, excessively high grain protein levels can also arise from low rainfall and high temperatures after anthesis. Therefore, malting barley growers must address both management and environmental uncertainties to produce profitable crops.

Table 1. Yield and quality of barley varieties at Lake Bolac

Variety	Yield (t/ha)	% of site mean	WLYP % of site mean	Protein (%)	Test Weight	Retention (%)	Grade	Gross Income ($/ha)
Oxford	7.60 a	119	114	11.2 ab	63.8	91.3	FEED1	1,520
Westminster	7.00 ab	109	105	10.6 b	67.3	94.0	FEED1	1,400
Capstan	6.55 bc	102	99	11.8 ab	63.1	76.3	FEED1	1,320
Hindmarsh	6.43 bc	100	91	12.0 a	66.4	84.7	FEED1	1,286
Commander	6.04 c	94	97	10.6 b	65.3	88.7	MALT1	1,238.2
Gairdner	4.84 d	76	73	11.1 ab	66.7	87.0	MALT1	992.2
Mean	*6.4*			*11.2*	*65.4*	*87*		

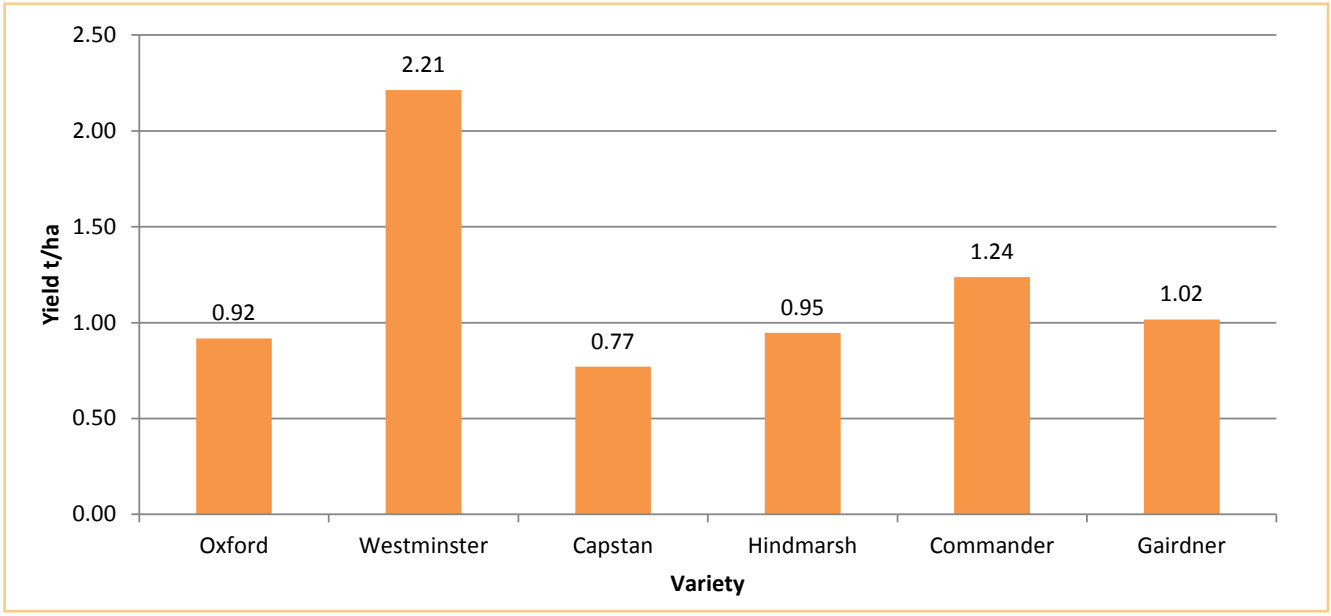
Means followed by same letter do not significantly differ (P=.05, LSD). Grain yields were corrected to 12.5% moisture. Gross incomes represent the mean yield of each variety. Grain prices for Malt: $205/t, Feed: $200/t (Harvest delivery to Geelong Port. Source: Riordan Grain)

The 2011 season has highlighted the yield penalty that can be experienced when growing malting varieties. With the malt price offering just $5/t premium over the feed price the returns from growing malt varieties are much reduced compared to feed varieties. This is mainly because of the lower yields of malting varieties; – both Commander and Gairdner were the two lowest ranked varieties in this trial.

This can be explained in more detail by comparing the financial performance of the Gairdner malting cultivar against the Oxford feed cultivar. With a yield difference of 2.76t/ha in this trial this year (graph 1), and with the feed price closely aligned to the malt price, Oxford achieved $527.8/ha more in gross income than Gairdner. In other words the Garidner would need to be trading at $314/ha given its yield this year, in this trial, in order to achieve a similar gross income to that of Oxford. That means a malt premium of $114/ha over feed in this year based on this trial.

The graph below displays the effect of applying a fungicide. One replicate of the four in the trial received no fungicide. This enabled us to observe the potential yield effect that fungicides have on each of the six varieties. As you can see from the graph all varieties displayed a positive response from the application of a fungicide. Westminster achieved the highest yield increase at over 2t/ha from the untreated.

Graph 2. Yield difference as a result of treated vs untreated



These yield differences must be treated with caution as statistically they cannot be confirmed due to only one of the 4 reps being left untreated.

There is an indication that the use of fungicides can increase yield. An additional benefit from those products that contain a mixture of active ingredients such as tebuconazole & prothioconazole in Prosaro, is the 'greening effect'. By increasing & maintaining the green leaf area for longer, keeping leaf necrosis at a minimum, you can expect to increase yield.

Disease resistance ratings must also be acknowledged in their contribution to yield and these should always be the starting point for varietal choice in high rainfall regions.

Image 2. Gairdner barley at Lake Bolac