

2013 Barley Agronomy Research Update
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The Southern Australian Barley Agronomy Project is a tri state initiative funded by GRDC aimed to develop improved agronomic practices for new barley varieties. The project in SA is conducted in association with farming system groups undertakes research on varietal responses to agronomic practices. The current trial at the MNHRZ site is primarily focused on canopy management with respect to variety, nitrogen rate, timing, and plant growth regulators

Nitrogen and canopy management in barley:

The lower grain protein commonly observed in Buloke and Commander can be largely explained by the negative correlation that exists between grain yield and protein. However, we have found that across a wide range of environments, grain protein differences among varieties still exist after eliminating the grain yield influence. For any given yield level Oxford, Commander, Buloke, and Scope have achieved a lower protein content (approximately -0.5%) relative to the current range of commercial varieties grown at the same yield level. Therefore these varieties may require variety specific N strategies to maintain grain protein at desirable levels.

Based on relative varietal responses to N, there is evidence to suggest Commander and Buloke may have a reduced ability to convert applied N into grain yield and grain protein compared to other varieties. In situations where soil N status is low, a yield response to applied N is likely to be greater in a more responsive variety like Hindmarsh. Under higher yielding and low fertile situations growers may need to apply more N (relative to other varieties) on low grain protein varieties Buloke and Commander in order to achieve protein standards. Conversely Commander and Buloke may also be more useful options under conditions conducive to high grain protein levels which have been historically a problem in SA.

Increasing up-front N fertilization and sowing Commander into paddocks high in residual N is not always desired as Commander can be susceptible to lodging in high yielding situations. Other research trials have demonstrated that similar yields but higher proteins can be achieved without increasing N supply by shifting N applications away from sowing to early stem elongation in high yielding environments (table 1). This strategy only works if the applied fertilizer is taken up (ie good follow up rainfall allowing N into root zone) and provided there is adequate N to maintain reasonable crop growth throughout the vegetative period. Delaying N to the onset of stem elongation has been less reliable when sowing was later due to environmental conditions being more volatile for N application (warmer conditions and drier soils). At earlier sowing dates there is more opportunity to manipulate the crop canopy with N management to improve protein.

Table 1. Mean grain yield and grain protein responses to the same N supply applied either early (at sowing) or delayed (applied at onset of stem elongation) across sowing dates in Commander in 3 trials from 2010 – 2012 (Hart and Tarlee)

Sowing time	Yield kg/ha			Protein (%db)		
	Nil	Early N	Delayed N	Nil	Early N	Delayed N
Early Sowing (pre May 20)	4114	5056	4931	8.3	9.9	10.4
Later sowing (post June)	4131	4790	4381	9.4	10.3	11.2
LSD (5%) Sow date x N		255			0.41	

Canopy management techniques such as earlier sowing coupled with delayed N application closer to the onset of stem elongation may provide the best long term management strategy to consistently achieve max yield and quality requirements in low protein varieties Buloke and Commander.

The variety grain yield responses to sowing date at Tarlee in 2012 are shown below (figure 1). Although conditions were favorable the earlier maturing varieties performed the best at both May 17, and Jun 6 sowing. GrangeR has generally been considered as a medium – late Gairdner like variety however in 2012 it yielded higher than Gairdner at earlier sowing. Data from phenology trials has shown GrangeR to be flowering at a similar time to Buloke at earlier sowing, and up to a week earlier than Gairdner. This is likely to explain the relative yield responses observed in 2012. There is now a range of genuine mid – late maturing varieties such as Bass, Flinders, and Wimmera that are likely to be suited to early sowing in the higher rainfall zones. More agronomic data is needed to confirm the fit of these new varieties and to classify the phenology responses of current varieties.

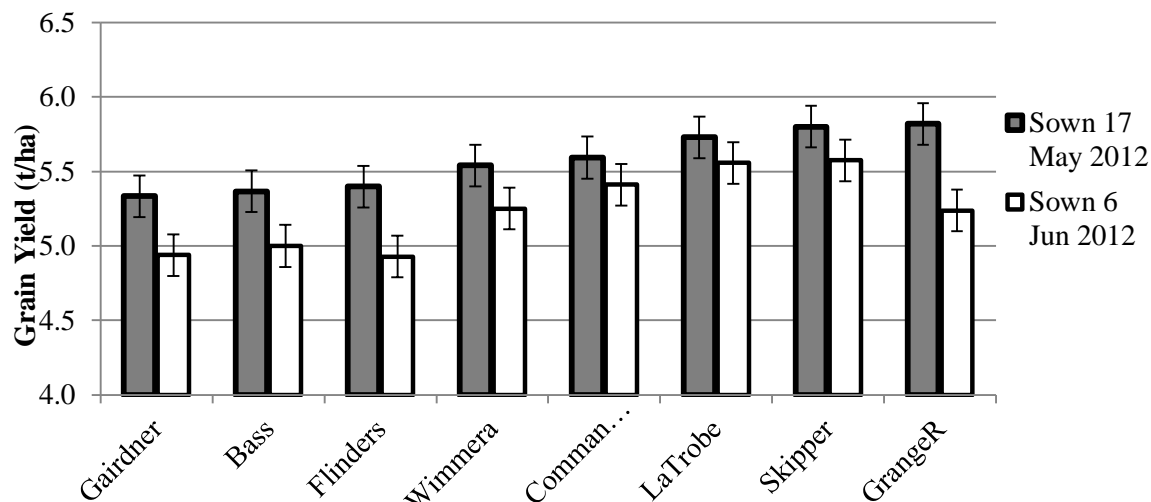


Figure 1. Mean variety grain yield across all N treatments sown on the 17th May, and 6th June, Tarlee MNHRZ 2012.

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Tarlee MNHRZ Barley Agronomy Trial Plan

Bay Row	Barley Sowing Plan			Nitrogen Treatment Plan (kgN/ha at sowing/GS30)					
	10m	10m	10m	10m		10m		10m	
	1	2	3	5m	5m	5m	5m	5m	5m
	Bufur Mix	Buffer	Buffer	Buffer Mix		Buffer		Buffer	
1	Grange	Navigator	Westminster	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
2	Compass	Bass	Skipper	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
3	Westminster	Wimmera	Compass	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
4	Bass	LaTrobe	LaTrobe	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
5	Wimmera	Grange	Commander	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30

6	Navigator	Commander	Bass	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
7	Commander	Westminster	Wimmera	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
8	Skipper	Compass	Navigator	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
9	LaTrobe	Skipper	Grange	Nil	30 Sow	90 Sow	60 Sow	90 GS30	60 GS30
10	Grange	LaTrobe	Commander	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
11	Wimmera	Compass	Wimmera	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
12	WI4593	Westminster	Navigator	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
13	Westminster	Grange	Westminster	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
14	Skipper	Commander	Skipper	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
15	Navigator	Wimmera	LaTrobe	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
16	LaTrobe	Bass	Compass	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
17	Commander	Skipper	Grange	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
18	Bass	Navigator	Bass	90 Sow	60 GS30	Nil	90 GS30	60 Sow	30 Sow
19	Westminster	LaTrobe	Westminster	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
20	Skipper	Bass	Navigator	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
21	Compass	Commander	Wimmera	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
22	LaTrobe	Skipper	Grange	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
23	Commander	Navigator	Compass	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
24	Bass	Westminster	Bass	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
25	Wimmera	Grange	Commander	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
26	Navigator	Compass	Skipper	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
27	Grange	Wimmera	LaTrobe	60 Sow	90 GS30	60 GS30	30 Sow	90 Sow	Nil
	Buffer	Buffer	Buffer	Buffer		Buffer		Buffer	