Grazing cereals – farmer demonstrations, Rainbow

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Take home messages

- *Four farmer grazing cereal demonstrations showed no difference in yield between grazed and un-grazed crop.*
- *Grazing increased screenings in all 4 demonstration paddocks.*
- *When grazing cereal crops, it appears that the rules of thumb developed in the high rainfall zone (not grazing until plants can't be pulled out of the ground (around GS13) and removing stock before GS30) also apply to the Wimmera Mallee.*

Background

Grazing sheep on cereals between crop GS13 and 30 has been trialled in high rainfall zones across Australia with much success. However, little research has been carried out in low rainfall environments with shorter season cereal varieties.

Wimmera Mallee farmers are interested in how some of the same principles being used in the high rainfall zone can be applied in the lower rainfall environment. If grazing cereals can be done economically, farmers will be able to increase the adaptability and flexibility of their farming systems.

Aim

To assess the yield and grain quality effect of grazing on currently grown commercial cereal varieties via paddock scale demonstrations in the Rainbow district.

Method

Four demonstration paddocks were selected by local growers in the Rainbow district to participate in the grazing trial. 2 of the selected paddocks were sown to Hindmarsh barley and 2 were sown to CLF_STL wheat.

All paddocks were sown according to each farmer's commercial practice and at a sowing time that fitted in with their program (Table 1). After sowing, a 1/ha plot was fenced off within each of the paddocks to be grazed.

Table1. Varieties, sowing date and row spacing of the 4 demonstration paddocks.

Paddock	Variety	Sowing date (2009)	Row spacing (cm)
Smith	Hindmarsh barley	27 April	34
Fuller	CLF_STL wheat	2 May	35
Stasinowksy	Hindmarsh barley	30 May	22.5
Robinson	CLF_STL wheat	25 May	30

Dry matter and feed-test samples were taken for each paddock prior to grazing. 10 samples were taken from within the area to be grazed and 10 samples were taken from outside the grazed area.

To give farmers a guide before grazing, theoretical grazing days were established based on the dry matter cuts. This calculations was worked out using the formula:

dry matter (DM) kg/ha – 30kg/ha (physically unavailable DM) x feedtest Metabolisable Energy (ME) / 8MJ.

The assumption was made that each dry sheep equivalent (DSE) requires 8MJ/day.

Farmers determined a stocking rate and grazing practice and were responsible for putting sheep in the monitoring grazing area and then removing them. The only conditions were all paddocks were to be stocked as the crop reached GS13 – 15 and all stock had to be removed before the crop reached GS30. The crop growing outside the fence was used as the guide as to when the crop had reached GS30. If the farmer decided to crash graze, it was up to the farmer to determine when the sheep needed to be removed.

- The Smith paddock was crash grazed for 3 days with 100 ewes. After the 3rd day the farmer placed another 200 ewes in the plot. All ewes were removed 2 days later (900 DSE days of grazing).
- The Fuller paddock was stocked with 14 dry ewes for 9 days (126 DSE days of grazing).
- The Robinson paddock was stocked with 11 wethers for 14 days (154 DSE days of grazing.
- The Stasinowsky paddock was crash grazed by 320 weaner ewes for 3 days (960 DSE days of grazing).

Once sheep were removed, crops were then grown through to harvest. To calculate grain yields, 1m of crop row was taken at 10 points across the 1ha plot and compared to 10 points outside the 1ha plot. These samples were then threshed to get a grain sample that could be weighed to determine yield, protein and screenings.

The feed value of the grazed crop was calculated based on the theoretical DSE days that were calculated and the supplementary feed cost required to maintain the same DSE number for the same amount of time. The cost of supplementary feed was valued at $200/t eg theoretical DSE x 0.5kg (supplementary feed) x 0.20cents/kg feed.

Results

Dry matters recorded at GS13 showed varying amounts of feed available.

Table 2. Dry matter recorded pre-grazing across the demonstration zone. Theoretical grazing days for the grazed area are in brackets.

Paddock	DM kg/ha (theoretical grazing days)
Smith – Hindmarsh barley	113 (126 DSE days)
Fuller – CLF_STL wheat	145 (173 DSE days)
Stasinowsky – Hindmarsh barley	143 (180 DSE days)
Robinson – CLF_STL wheat	189 (238 DSE days)

Feed tests were conducted to assess the quality of the feed on offer. *FeedTest* is a commercial service available to farmers and industry which can determine the quality of feed. While no statistical analysis could be completed on the feed test results it was interesting to note that across all 4 demonstration paddocks the feed test results were similar.

Crude Protein (CP %) measures the amount of nitrogen (N) in a feed source. Sheep require protein for growth, pregnancy and lactation.

Metabolisable Energy (MJ/kg DM) is the energy that is available in feed for use by the sheep.

Digestibility (% of DM) is an indicator of the quality of a feed and how much energy the feed contains. If a feed is described as being 50% digestible then only half of the feed eaten can actually be used by the sheep, the other half will be excreted.

Table 3. FeedTest results for each paddock before the crop was grazed.

Paddock	CP %	ME (MJ/kg dry matter)	Digestibility (% of dry matter)
Smith – Hindmarsh barley	31.2	12.1	79.6
Fuller – CLF_STL wheat	29	12.5	81.8
Stasinowsky – Hindmarsh barley	31.1	12.7	82.7
Robinson – CLF_STL wheat	31.2	12	79

Feed values were calculated using the formula outlined in the methods section and the value of feed for each paddock were: Smith – $12.55/ha, Fuller – $17.20/ha, Stasinowsky – $18/ha and Robinson – $24/ha.

No yield penalty was incurred from grazing in any of the four demonstration paddocks. None of the grazing strategies either crash grazing or lightly stocking made any difference to the crop recovery (Table 4.)

Table 4. Grain yield for ungrazed and grazed treatments

Paddock		Grain Yield (t/ha)		Crop Yield Penalty
		Ungrazed	Grazed	
Smith	Hindmarsh barley	3.1	3.2	No statistical yield difference.
Fuller	CLF_STL wheat	2.5	3.0	No statistical yield difference.
Stasinowksy	Hindmarsh barley	3.9	3.9	No statistical yield difference.
Robinson	CLF_STL wheat	1.8	1.8	No statistical yield difference.

Across the 4 demonstration sites there was no consistent trend or difference in protein between the grazed and ungrazed area. In relation to screenings, while the data could not be statistically assessed there was a trend of higher screenings in the grazed areas which is supported by BCG's replicated trial work (see Woomelang grazing cereal article in this manual page 46).

Table 5. Grain protein and screenings for ungrazed and grazed treatments

Variety	Protein (%)		Screenings (%) (retention)	
	Ungrazed	Grazed	Ungrazed	Grazed
Smith – Hindmarsh barley	10.8	10.2	1.7 (86.7)	3.9 (89.9)
Fuller – CLF_STL wheat	10.6	11.5	0.7	1.7
Stasinowsky – Hindmarsh barley	13.3	14.6	4.7 (85)	10.8 (68.5)
Robinson – CLF_STL wheat	10	9.9	1.3	1.8

Interpretation

Based on these farmer demonstrations there is no negative impact on yield from grazing cereals. While protein was not affected in these demonstrations, grazing does seem to increase screenings.

It should be noted that the paddocks that were crash grazed exceeded the theoretical amount of DSE days and it could be assumed that grazing under this regime would have caused stock to lose condition. The lightly stocked paddocks closely matched the theoretical DSE days calculated. Stock in these paddocks would have been meeting their nutritional requirements.

The additional dollars associated with feed value would increase the gross margins achieved by farms in situations where supplementary feeding would otherwise have been required, particularly because no yield penalty was incurred. This is a big advantage of being able to graze cereals in a low rainfall environment.

BCG's replicated trial work undertaken at Woomelang in 2009 showed that yield response to grazing was variety dependent and that some commonly grown varieties (eg Axe, Young, Hindmarsh) in the Mallee can suffer a yield penalty. However, in Rainbow these yield penalties were not realised. In a farmer demonstration at Jil Jil, grazed Hindmarsh did suffer a reduction in yield after it was grazed compared to the rest of the crop that was not grazed.

By applying the recommended rules of thumb developed in the high rainfall zone which is to only stock once cereal plants can no longer be tugged out of the ground (about GS13) and remove stock before the crop reaches GS30 there appears to be little impact on crop production and an associated benefit from the increased grazing.

Despite not being particularly evident in these farmer demonstrations, additional rules likely to apply to this region may be to only graze crops that are sown early (before 15 May), and to avoid grazing shorter season varieties. However, more trial work will develop these rules of thumb for this region.

These results can be used to increase farmer confidence to graze cereals in the Wimmera Mallee.

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