

# Dual purpose cereals

## Summary

In 2005, at Marnoo a simulated grazing trial using different wheat and oat varieties showed that with a late start to the season there was insufficient herbage produced to make grazing a viable option. The loss in grain yield was far greater than the return from grazing (\$130/ha in lost grain production versus \$22/ha gain in grazing income).

## Background

The integration of livestock into the cropping program is of increasing interest to many farmers as:

- Prices for meat are maintained and prices for grain are under pressure.
- A risk management tool to decrease dependence on a single enterprise.
- Livestock can be an integral component of weed management practices.

There are many practices which farmers can use to improve the profitability of their livestock programs and some of these are raised in this manual (see paper titled Better Grazing Systems). A key component to improve the profitability of a livestock program is to fill the feed-gap in autumn. The April-May-June period is a bad time in most seasons because pasture growth is slow and there is competition between keeping paddocks for sheep feed and the need to sow crops on time. One solution to the feed gap could be to grow dual-purpose cereals where the cereals are sown early, grazed intensively, sheep withdrawn and crops harvested. Getting the best of both worlds never works perfectly but it is worth investigating.

Dual purpose cereals have been part of intensive livestock – cropping programs in high rainfall areas in southern NSW. Some work was done in the early 1990s in the Charlton district but was not continued. The BCG saw the opportunity to re-open the discussion and see whether there are opportunities in the lower rainfall zones of the Wimmera and Mallee for dual-purpose cereals.

The BCG undertook work at Marnoo with (i) a demonstration of different cereal types and varieties: mown (to simulate grazing) compared to normal production without mowing; and (ii) a trial with Graza oats which was mown at different times and had different N fertiliser treatments.

## Methods

### (i) Demonstration of different Wheat and Oat varieties as dual purpose cereals

<b>Crops:</b>	Three wheat (Rosella, Whylla and Whistler) and three oat (Potoroo, Saia and Wintaroo) varieties.
<b>Treatments:</b>	Demonstration of slashed (two timings) versus control (un-slashed) both taken through to harvest.
<b>Sowing date:</b>	2 June 2005
<b>Fertiliser:</b>	Sowing: Granulock 10Z 60kg/ha Top-dress: Urea at 60kg/ha over all plots at the last slashing

The slashed plots were mown at two growth stages – 5 leaf (GS15) and at the end of tillering (GS30). Slashed samples at the end of tillering were sent off for feed analysis (FeedTest). After the last slashing all plots had urea at 60kg/ha. Plots were then taken through to harvest.

## **(ii) Trial investigating dual purpose oats for hay**

**Crop:** Saia oats

**Treatments:** Trial with sowing rate (x2) and N rate (x2) all slashed twice and cut of hay

**Replicates:** 4

**Sowing date:** 31 May 2005

**Fertiliser:** Sowing: Granulock 10Z 60kg/ha

The crops were slashed at two growth stages, 5 leaf (GS15) and end of tillering (GS30). After the last slashing crops were taken through to the milky dough stage when they were cut for hay production.

## **Results**

### **(i) Demonstration of different Wheat and Oat varieties as dual purpose cereals**

The dry matter production for 3 wheat and 3 oat varieties and their final grain yields are presented in Table 1.

**Table 1:** Dry matter cuts at 5 leaf (Dry Matter 1) and end of tillering (Dry Matter 2) and harvested grain yield for 3 wheat and 3 oat varieties at Marnoo

Variety	Simulated grazing treatment	Dry Matter 1 t/ha	Dry Matter 2 t/ha	Yield t/ha	Yield (t/ha) Un-slashed (control)
Rosella	Slashed	0.4	0.6	2.6	3.7
Whylla	Slashed	0.4	0.5	2.4	3.4
Whistler	Slashed	0.4	0.6	2.5	3.4
Potoroo	Slashed	0.4	0.7	2.0	3.6
Saia	Slashed	0.2	0.2	1.6	1.3
Wintaroo	Slashed	0.5	0.5	2.6	2.8

The dry matter production for the different cereals was similar (except for the Saia oats which grew slowly and yielded poorly). Herbage production was calculated on a daily basis from the two dry matter cuts and the theoretical grazing pressure for weaned lambs was estimated (Table 2).

The assumptions in grazing pressure and returns are that growing lambs consume 2kg/ha/day of good quality herbage, and the income is calculated on an agistment basis of 30c/head/week.

**Table 2:** Herbage produced, stocking rate (lambs) and income from agistment

	<b>Sowing to 5 leaf</b>	<b>5 leaf to end of tillering</b>
Grazing period	10 weeks	3 weeks
Herbage production total	400 kg/ha	600 kg/ha
Herbage production per day	5.7 kg/ha/day	30 kg/ha/day
Lambs/ha/week	2.9	15
No. of weeks	10	3
\$/ha income	8.70	13.50

The total return from the grazing was \$22.20.

The nutritional value of the different crop types slashed at the end of tillering (GS30, on September 1) is presented in Table 3. The feed analysis was undertaken at the time that livestock would be taken out of the paddock.

**Table 3:** Feed analysis for 3 wheat and 3 oat varieties at the end of tillering (early September)

	<b>Crude Protein %</b>	<b><sup>1</sup>Neutral Detergent Fibre %</b>	<b><sup>2</sup>Digestibility %</b>	<b><sup>3</sup>Metabolisable Energy MJ/kg DM</b>
Rosella	25.5	51	61	9.4
Whyla	25.7	52	64	9.9
Whistler	25.9	53	64	10
Potoroo	24.8	51	67	10.6
Saia	27.8	48	67	10.6
Wintaroo	26.8	50	66	10.4

<sup>1</sup>Neutral Detergent Fibre is plant cell wall material that livestock cannot digest – the lower the value the more sheep can eat.

<sup>2</sup>Digestibility is the ability by livestock to digest the plant material consumed.

<sup>3</sup>Metabolisable energy (MJ/kg DM) is the feed energy which can be used by the animal.

The protein content of the cereals was very high. A growing lamb will need a diet of 16% Protein with a Metabolisable Energy of 11 MJ/kg DM. The quality of this dual purpose cereals is good for protein but on the low side for ME.

#### **(ii) Trial investigating dual purpose oats for hay**

The dry matter production of Saia oats during the season and as hay at the end of the season was assessed (Table 4).

**Table 4:** Saia oat seeding rate and pre-drilled urea by dry matter at 5 leaf (Dry Matter 1) and at the end of tillering (Dry Matter 2) and hay yield.

Seed rate as Plants/m <sup>2</sup>	Predrilled Urea kg/ha	Dry Matter 1 t/ha	Dry Matter 2 t/ha	Hay yield t/ha
175	50	0.3	0.7	4.1
175	100	0.3	0.8	4.3
250	50	0.4	0.6	3.6
250	100	0.5	0.7	3.9
<b>Significant difference: LSD 0.05</b>		<b>P=0.04 0.1</b>	<b>NS</b>	<b>NS</b>

Saia oats sown at the high seeding rate had a significantly higher dry matter production yield at the first slashing. For the slashing conducted at the end of tillering there was no difference in herbage production or as hay at the end of season, between seeding rate and urea rate.

## Interpretation

The cereals produced good nutritional feed during the early growth phase (up to the end of tillering), which was suitable for fattening lambs. However, the potential stocking rates were low, (for the first part of the season up to the five leaf stage only 2.9 lambs/ha/week (for a 10 week period); and from the five leaf to the end of tillering phase 15 lambs/ha/week (for a three week period). This was primarily due to the late break in 2005 – there was no rain in April and May and the break came in the second week of June. There was only an income of \$22.20/ha received from the grazing.

The grazing resulted in a significant reduction of 1t/ha in crop yield (at a cost of approximately \$130/ha).

To have any chance of producing sufficient quantity of herbage for early grazing the crop needs to be sown and germinate in April (preferably late March to early April). The varieties chosen for this work were all suited to early sowing.

## Commercial Practice

Dual purpose cropping can have a role in an intensive grazing operation if crops can be sown on an early break – early growth is essential whilst conditions are still warm.

The season will have to have a mild finish otherwise yield will be lost from the early grazing.

More work needs to be done in the Wimmera and Mallee to see whether it is commercially viable to graze cereal crops early in the season, without suffering a yield penalty at the end of the season. It might only be a proposition in those areas which have a regular early start to the season and a longer wetter finish.