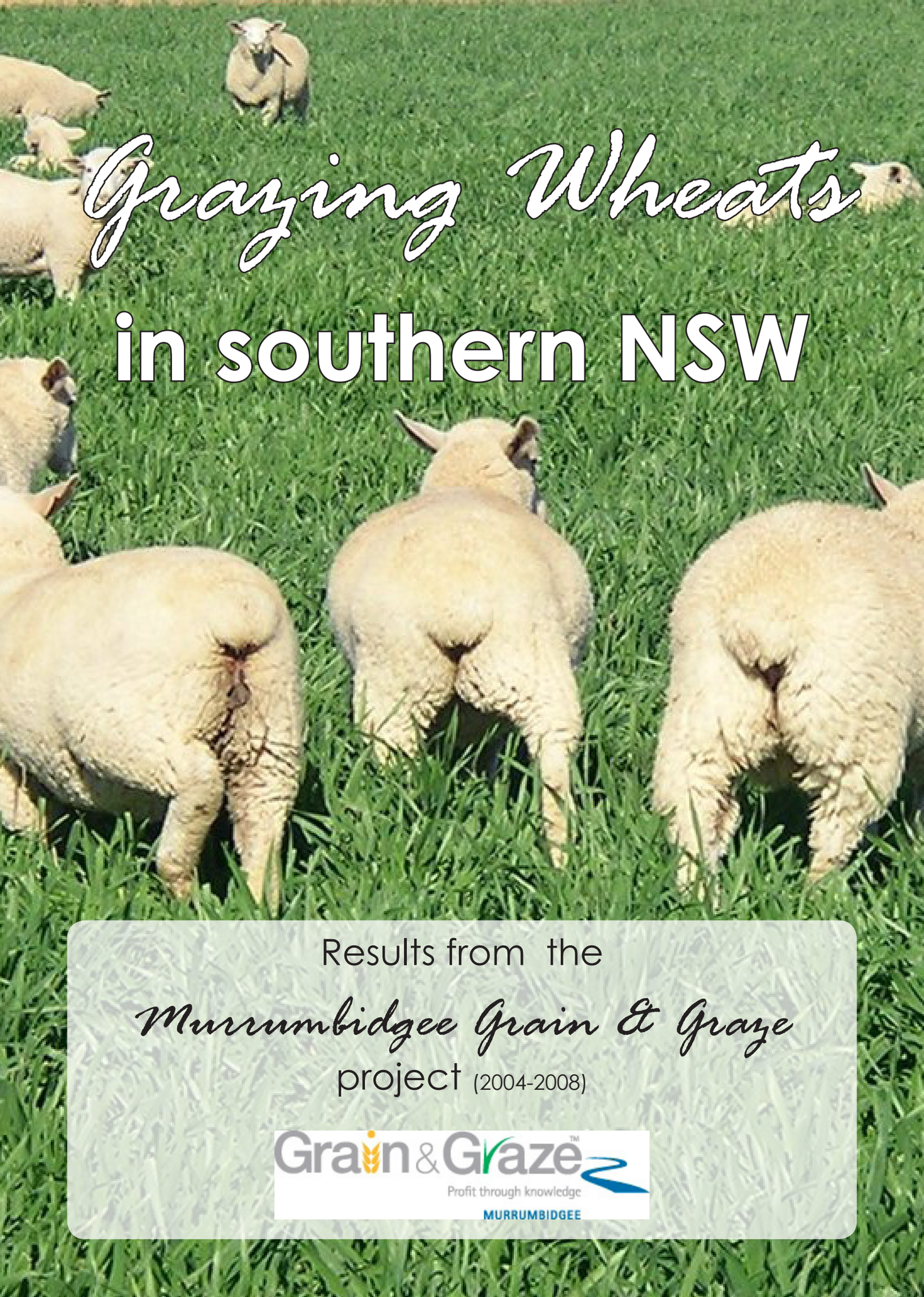


Grazing Wheats in southern NSW

Results from the

Murrumbidgee Grain & Graze project (2004-2008)

Grain & Graze™

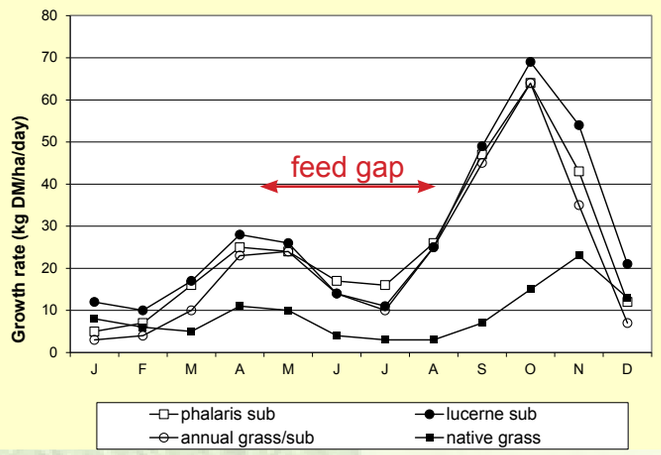
Profit through knowledge

MURRUMBIDGEE

The project...

The Murrumbidgee Grain & Graze project was one of a number of projects across Australia funded by a consortium of agencies to improve the triple bottom line of mixed farming enterprises. The main focus of the Murrumbidgee project, involving FarmLink Research, I&I NSW, CSIRO, Charles Sturt University and Murrumbidgee CMA, was on the management of grazing wheats to help fill the autumn/winter feed gap, which is a common issue in the region (Figure 1).

Figure 1 - Feed production curve for South-West Slopes NSW (source: Prograze™)



The Murrumbidgee project initially focused on the dry matter potential of commercially available dual-purpose wheat varieties over a number of sowing times, comparing potential returns from both grazing and grain recovery. As the project developed, management trials were included with input from the steering committee of growers, advisers and researchers. Such trials included grazing intensity, grazing preferences, animal liveweights and mineral supplements. Dual purpose canola was also included in the project, however drought conditions limited results. A summary of outcomes from the CSIRO dual purpose canola project has been included on page 11.

Despite variable seasons, valuable results were achieved through the project, resulting in a significant increase in adoption of grazing wheats in the region. Adoption was enhanced by complementary workshops and seminars that were also funded through the project, including fodder budgeting workshops and supplementary feeding seminars.

A second round of Grain & Graze projects will commence across the country in 2011. FarmLink and Central West Farming Systems are hosting the project for central/southern NSW, which will incorporate a number of projects focusing on grazing systems.

Project Conclusions:

Dual purpose wheats - grazing and grain recovery

- Grazing can be successfully carried out at significantly higher stocking rates than traditionally recommended to utilise the high quantity of dry matter produced during winter.
- High stocking rates combined with long grazing periods (~ six weeks) reduced grain yields, but losses may be offset by income from additional liveweight gains, depending on prices. Stock should be removed before GS31 (stem elongation) to prevent yield losses.
- In drier seasons, limited trial data and anecdotal reports showed that grazing can result in higher grain yields, potentially due to water 'saved' from reduced leaf area then being available for grain fill later in the season. In wetter springs, yield losses from grazing can be limited by delayed maturity allowing the crop to utilise late rainfall.
- Grazing delayed flowering in winter wheats by up to 16 days, which can have implications for sowing times to manage frost/heat stress.
- The risk of wheat streak mosaic virus in early sown wheat crops has limited the adoption of dual purpose wheats in higher rainfall areas.

Dual purpose wheats - liveweight responses

- Young sheep grazing dual purpose wheats showed significant liveweight gains when supplemented with NaCl (salt) and MgO (eg. Causmag) at a ratio of 1:1.
- Sheep showed no grazing preferences between different wheat varieties.
- Grazing wheats showed high nutritive values that would not be expected to constrain animal growth rates.

Table 1 - Grain & Graze trial timeline

Location	Grazing wheat trial details	Location	Grazing wheat trial details
2004		**2006 (drought affected)**	
Marrar	• dry matter & grain recovery across sowing times • grazed/ungrazed water use comparison • grazing preference across varieties • lamb liveweights across varieties	Eurongilly	• dry matter & grain recovery compared with canola**
Yerong Creek	• dry matter & grain recovery across sowing times	Ganmain	• dry matter & grain recovery compared with canola**
Grenfell	• dry matter & grain recovery across sowing times (locust damage)	Marrar	• trade-offs between grazing intensity and grain recovery (sheep)** • lamb liveweights with supplements
Cookardinia*	• trade-offs between grazing intensity and grain recovery (sheep)		
2005		**2007 (drought affected)**	
Marrar	• dry matter & grain recovery across sowing times • grazed/ungrazed water use comparison	Collingullie	• grazing commencement & duration**
Yerong Creek	• dry matter & grain recovery across sowing times	Ganmain	• cattle liveweights** • row spacing effects on dry matter/yield**
Wallendbeen	• trade-offs between grazing intensity and grain recovery (sheep) • lamb liveweights with supplements	Muttama	• row spacing effects on dry matter/yield**
Cookardinia*	• trade-offs between grazing intensity and grain recovery (sheep)	Wagga Wagga	• lamb liveweights in lucerne/grazing wheat rotations

**The Cookardinia trials were conducted as part of the GRDC project 'Genotype and management combinations for highly productive cropping systems in the higher rainfall zone of southern Australia' (Virgona, Angus et al). They have been included in this report to complement results achieved through the Grain & Graze project.*

***Limited data due to drought conditions.*

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Research Team:

- I&I NSW: Guy McMullen, Peter Martin, Vince Van der Rijt
- CSIRO: Hugh Dove, Warren Bond
- CSU: Jim Virgona
- FarmLink: Katrina Durham, Kirrily Condon, Felicity Harris

Steering Committee:

- Richie White, Cootamundra
- John Pattison, Marrar
- Bernard Hart, Old Junee
- Derek Ingold, Dirnaseer
- Charles Kingston, The Rock
- Greg Condon, Grassroots Agronomy
- Alison Bowman, I&I NSW
- Jim Virgona, CSU
- Hugh Dove, CSIRO
- Rob Scriven, Murrumbidgee CMA
- Katrina Durham/Kirrily Condon, (formerly) FarmLink

Trial Co-operators:

- John Pattison, Marrar
- Peter & Mark Yates, Yerong Creek
- Duncan Lander, Grenfell
- David & Cathie Fox, Marrar
- Ken Jacobs, Wallendbeen
- James Brady, Eurongilly
- Ben Cruikshank, Ganmain
- Malcolm & Des Kohlhagen, Collingullie
- Jeremy Litchfield/Sandy Biddulph, Muttama

This document was produced by Kirrily Condon, Grassroots Agronomy on behalf of FarmLink Research and the Grain & Graze research team, March 2011.

Further information is available from the FarmLink website at www.farmlink.com.au

Grazing wheats... grazing & grain recovery

Trials conducted through both the Grain & Graze and GRDC* projects in 2004 and 2005 produced new outcomes in relation to grazing management of dual-purpose wheats and its impact on grain recovery, as follows:

- Grazing was successfully carried out at significantly higher stocking rates than traditionally recommended to utilise the high quantity of dry matter produced during winter.
- High stocking rates combined with long grazing periods (~ six weeks) reduced grain yields, but losses may be offset by income from additional liveweight gains, depending on prices.
- In drier seasons, limited trial data and anecdotal reports showed that grazing can result in higher grain yields, potentially due to water 'saved' from reduced leaf area then being available for grain fill later in the season. In wetter springs, yield losses from grazing can be limited by delayed maturity allowing the crop to utilise late rainfall.
- Grazing delayed flowering in winter wheats by up to 16 days, which can have implications for sowing times to manage frost/heat stress.

**GRDC funded project 'Genotype and management combinations for highly productive cropping systems in the higher rainfall zone of southern Australia'.*

Traditional advice regarding the grazing management of winter wheats has been conservative, recommending high initial and residual dry matter levels before and after grazing.

However recent research through Grain & Graze and GRDC projects has shown that grazing intensity can be more vigorous to make better use of high growth rates through winter, while still providing acceptable grain yields. While this is particularly the case in favourable seasons, positive economic yields post-grazing were also achieved in drier seasons, although in all situations care must be taken to avoid grazing of the developing heads. Details of the projects are as follows:

Photo: K. Condon

Figure 2a. *Prolonged grazing had a greater impact on grain yields than high stocking rates at the Wallendbeen and Cookardinia trials.*

High stocking rate (~30 DSE/ha) at Wallendbeen, August 2005

Photo: K. Condon

Figure 2b. ***Low stocking rate (~18 DSE/ha) at Wallendbeen, August 2005***

Photo: K. Condon

Figure 2c. *Ungrazed yields were affected by greater disease pressure.*

Ungrazed Wedgetail at Wallendbeen, August 2005.

- **Grazing intensity** - ***to determine any trade-offs between grazing intensity and grain recovery.***
  - Three replicated trials were undertaken at Cookardinia (2004 & 2005) and Wallendbeen (2005) to determine the impact of grazing duration and lamb stocking rates on grain recovery of Wedgetail wheat:
    - ***Cookardinia (2004)*** - *Compared six grazing durations from nil to 51 days, commencing at approximately 400kg DM/ha. Stocking rate was varied to achieve similar levels of residual dry matter after each grazing (Table 2).*
    - ***Cookardinia and Wallendbeen (2005)*** - *Compared combinations of two grazing durations (~three or six weeks) and two stocking rates (~17 or 30 DSE/ha) - Table 2.*
  - Results from the trials showed the longest and most intense grazing treatments had the greatest impact on crop growth and development, resulting in the longest delay in flowering (up to 16 days), consumption of heads (3 to 8%) and lowest residual dry matter. Although these impacts resulted in grain yields declining by up to 30% compared with nil grazing (Table 2), simple economic analyses show losses could be offset in some years by income generated from additional liveweight gains, depending on grain and stock prices.
  - Above average spring rainfall in 2004 and 2005 at these sites clearly contributed to the grain recovery of the intensely grazed treatments, allowing time for crops to recover during the grain filling period with little impact on grain size. However winter growth rates in Wedgetail of up to 60kg DM/ha/day (far exceeding expected pasture growth rates over a similar period) also help explain how heavy stocking rates can be sustained over a long period without severely affecting grain yields, provided stock are removed before head damage occurs.
  - *Note that Wallendbeen yields were affected by disease, including wheat streak mosaic virus and take-all, particularly in the ungrazed treatments. The risk of wheat streak mosaic virus, common in early sown cereal crops, has limited the continued adoption of grazing wheats in higher rainfall areas of the region.*

- **Sowing time and grain recovery** - ***to determine the impact of sowing time on dry matter and grain recovery after 'crash-grazing'.***
  - *Trials at* ***Marrar and Yerong Creek (2004 and 2005)*** *compared the dry matter production and grain recovery of several dual-purpose wheat varieties across a range of*

Photo: K. Condon

Figure 3. *The higher stocking rates delayed stem elongation and, combined with prolonged grazing periods, delayed flowering by up to 16 days.*

Stem elongation in (l to r) high stocking rate, low stocking rate and ungrazed Wedgetail at Wallendbeen, August 2005

Table 2. Grazing intensity & grain recovery

Cookardinia 2004 - 304mm in-crop rain

Wedgetail sown 25th April; grazed 6th July

Grazing duration (days)	Stocking rate (DSE/ha)	Dry matter at end of grazing (kg/ha)	Delay in flowering (days)	Yield* (t/ha)
nil	-	-	-	5.9[a]
15	varied to achieve similar dry matter after each grazing duration	656	1	6.0[a]
26		669	5	4.9[b]
37		543	5	4.8[b]
45		656	8	4.7[b]
55		415	11	3.9[c]

Cookardinia 2005 - 452mm in-crop rain

Wedgetail sown 25th April; grazed 12th July

Grazing duration	Stocking rate	Dry matter at end of grazing	Delay in flowering	Yield* (t/ha)
nil	-	-	-	5.8[a]
short - 21	low - 17	1600	2	5.8[a]
short - 21	high - 29	697	4	5.8[a]
long - 41	low - 17	1226	6	5.4[b]
long - 41	high - 29	202	13	5.0[c]

Wallendbeen 2005 - 529mm in-crop rain

Wedgetail sown 17th March; grazed 11th July

Grazing duration	Stocking rate	Dry matter at end of grazing	Delay in flowering	Yield* (t/ha)
nil	-	-	-	3.2[b]
short - 28	low - 17	2520	7	3.8[a]
short - 28	high - 31	945	9	3.9[a]
long - 43	low - 18	2034	9	3.1[b]
long - 43	high - 33	725	16	2.3[c]

***Results followed by the same letter are not significantly different.**

sowing times ('early', at 'seasonal break', 'late'). At each trial, an ungrazed Wedgetail comparison was included in the 'seasonal break' sowing to determine grazing effects. The following results apply to Wedgetail (Table 3) which has been widely grown in the region as a dual-purpose variety:

- Late breaks to the season in 2004 and 2005 meant the 'early' sowing time in April experienced dry or marginal soil conditions at each of the trials. Where the crop was able to germinate before the seasonal break, the benefits of early sowing were evident, with Wedgetail producing significantly higher winter dry matter than later sowings (Figure 4).
- Yield outcomes from early sowing varied depending on spring rainfall, with a poor spring in 2004 resulting in similar yields across all sowing times. The only yield penalty from early sowing occurred as a result of heavier grazing to make use of the additional dry matter. In this case, the 12% yield loss could potentially be offset by income from additional liveweight gains.
- In the comparisons of grazed versus ungrazed Wedgetail sown on the seasonal break, the grazed crops yielded the same as *(Marrar '04 and '05)* or more than *(Yerong Creek '04)* the ungrazed crops. These results supported anecdotal reports from commercial paddocks grown under similar conditions, with limited spring rainfall.
- The installation of soil water monitors at the Marrar site (Figure 6) suggested the yield advantage may be a result of deferred water use, where the reduced leaf area from grazing decreased water requirements. The 'saved' water in the profile would then be available for grain fill later in the season.
- 'Deferred water use' by grazed crops was further investigated in the 2004 Cookardinia trial, comparing six grazing durations from nil to 51 days. By anthesis, reduced leaf area in the grazed crops meant there was 15mm more soil water available for grain fill than in the ungrazed crop, despite similar rooting depths. After anthesis, the longer grazed crops also extracted more water during grain fill, with their delayed maturity benefiting from late rainfall.
- The results suggest that in a good season with late rain, yield penalties from grazing are limited with delayed maturity allowing the grazed crop to utilise the additional moisture.

Photo: K. Condon

Figure 4. *Where the crop was able to germinate on marginal moisture before the seasonal break (back), winter dry matter production was significantly higher than later sowings (fore).*

'Early sown' (13th April) at back; 'sown on seasonal break' (23rd May) in foreground at Yerong Creek, July 2004

Photo: K. Condon

Figure 5. *Post-grazing growth rates of up to 100kg DM/ha in Wedgetail allowed a second 'crash' grazing in crops established before the seasonal break.*

Post-grazing of the 'early sowing' at Yerong Creek, July 2004

Photo: K. Condon

Figure 6. *Soil moisture meters installed at the Marrar site suggested that higher yields in grazed crops in drier years may be due to deferred water use.*

Moisture meters at the Marrar site, October 2005

Alternatively in a tight finish to the season, yield penalties from grazing can also be minimised through deferred water use from grazing until grain fill.

- Although the grazed versus ungrazed winter wheat comparisons are relevant to quantify the effects of grazing, yield comparisons to a well managed spring wheat are likely to produce a different outcome.

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Table 3. Sowing time & grain recovery

Marrar 2004 - 287mm in-crop rain Wedgetail[1] x 3 sowing times			
	'Early'	**'On break'**	**'Late'**
Sowing date	13th Apr (dry) germ. 25th May	27th May	8th June
Pre-graze dry matter (kg/ha)	2803[a]	2752[a]	2806[a]
Grazed	10-14th Aug	10-14th Aug	nil
Yield (t/ha) grazed ungrazed	2.6[a] -	2.6[a] 2.6 (NSD)	2.6[a] -
Yerong Creek 2004 - 261mm in-crop rain Wedgetail[1] x 3 sowing times			
	'Early'	**'On break'**	**'Late'**
Sowing date	13th Apr (marginal) germ. 2nd May	23rd May	9th June
Pre-graze dry matter (kg/ha)	3101[a]	2549[b]	2506[b]
Grazed	10-13th July 10-13th Aug	10-13th Aug	nil
Yield (t/ha) grazed ungrazed	3.2[a] -	3.5[ab] 3.0 (signif.)	3.0[b] -
Marrar 2005 - 389mm in-crop rain Wedgetail[1] x 2 sowing times			
	'Early'	**'On break'**	
Sowing date	5th May (dry) germ. 13th June	15th June	
Pre-graze dry matter (kg/ha)	1288[a]	983[b]	**NA**
Grazed	26-31st Aug	26-31st Aug	
Yield (t/ha) grazed ungrazed	3.6[a] -	3.1[b] 3.1[b]	
Yerong Creek 2005 - 388mm in-crop rain Wedgetail[1] x 2 sowing times			
	'Early'	**'On break'**	
Sowing date	13th April	14th June	
Pre-graze dry matter (kg/ha)	2666[a]	639[b]	**NA**
Grazed	12-15th Aug 27-29th Aug	27-29th Aug	
Yield (t/ha) grazed ungrazed	3.6[c] -	4.1[b] 4.5[a]	

**** Yields followed by the same letter are not significantly different. NSD = no significant difference.***

[1]Other varieties were included in the trials but Wedgetail has been recorded for its ungrazed comparison.

Grazing wheats... liveweight responses

Livestock responses to grazing wheats evaluated as part of the Grain & Graze project produced valuable results, particularly in relation to mineral supplements. Following are some of the major outcomes:

- Young sheep grazing dual purpose wheats showed significant liveweight gains when supplemented with NaCl (salt) and MgO (eg. Causmag) at a ratio of 1:1.
- Sheep showed no grazing preferences between different wheat varieties.
- Grazing wheats showed high nutritive values that would not be expected to constrain animal growth rates.
- Wheat intake by sheep was approximately 1400g DM/day, or 3.8% of liveweight (except in drought conditions).*

**Unfortunately drought conditions forced the abandonment of a cattle liveweight trial in 2007.*

Grazing wheats can provide very high liveweight gains, often exceeding those achievable on forage oats or pasture. However these weight gains can also be variable, with trials showing up to two-fold differences in weight gains in young sheep grazing seemingly similar wheat crops. Studies in the USA also show variability in cattle weight gains.

Although animal genotype may explain some of this variability, there are a number of other factors that could be influencing liveweights. These have been the focus of trials in the Murrumbidgee Grain & Graze project, including:

- **Grazing preference - *to determine if animal preference for a particular variety(s) contributes to variability in liveweight gains.***
  - Two trials were established at Marrar in 2004:
    - *A small plot trial of six dual-purpose wheat varieties which were assessed for grazing preference over a 24-hour period.*
    - *A large plot (0.2ha) trial of three dual-purpose wheat varieties that were stocked with crossbred weaners at 25 sheep/ha for 20 days to assess liveweight gains.*

Photo: K. Condon

Figure 7. *Grazing preference trials showed no preference for one particular dual purpose wheat variety over another.*

Grazing preference trial at Marrar, August 2004.

Photo: K. Condon

Figure 8. *Liveweight gains were similar across all dual purpose wheat varieties, averaging ~220g/day.*

Weighing lambs at the grazing preference trial at Marrar, August 2004.

Photo: K. Condon

Figure 9. *Animal intake, measured using alkane markers ingested in capsules, averaged ~1400g DM/day or 3.8% of liveweight, across the 2004/2005 trials.*

Inserting alkane markers for intake measurements at the grazing preference trial at Marrar, August 2004.

- Results showed there were no preference differences between varieties in either trial. Nutrient value, animal intake and liveweight gains (average 220g/day) were similar across all varieties (Table 4).

- **Nutritive value - *to determine if the nutritive value of dual-purpose wheats contribute to variability in liveweight gains.***
  - Samples of wheat forage tested from each of the liveweight response trials showed the dual purpose wheats had very high nutritive values that would not be expected to constrain animal intake and growth rates. Digestibility averaged approximately 85%, crude protein ranged from 22-33% and fibre content (NDF) 36-51%.

- **Animal intake - *to determine if the quantity of wheat consumed contributes to variability in liveweight gains.***
  - Animal intake of wheat dry matter was similar for the 2004 and 2005 trials, averaging ~1400g DM/day, or 3.8% of liveweight. However drought during the 2006 season affected crop growth, reducing intakes to ~1000-1200g DM/day, or 2.6-3.1% of liveweight.
  - Although intake did vary between animals, it did not influence the variability in liveweight gain. Further testing under paddock conditions is required for confirmation of this result.

- **Nutrient deficiencies - *to determine if nutrient deficiencies in dual-purpose wheats, relative to animal requirements, limit liveweight gains.***
  - Two trials were undertaken at Wallendbeen (2005) and Marrar (2006) to determine the impact of supplements on weight gains of young sheep grazing Wedgetail wheat:
    - ***Wallendbeen (2005)*** *- A large plot trial of three treatments including nil supplement, poor quality oaten hay and mineral supplements of Causmag (MgO), lime ($CaCO_3$) and salt (NaCl) at a ratio of 2:2:1 (supplements fed in self-feeders - Figures 10,11). The trial was stocked with crossbred weaners at 35 sheep/ha for approximately 40 days.*
    - ***Marrar (2006)*** *- A similar large plot trial to Wallendbeen, but with additional supplement treatments to determine which mineral was responsible for the increase in liveweight gain. Drought conditions meant sowing and therefore grazing commenced late (mid August) with crossbred weaners at 20 sheep/ha for 28 days.*

Photo: K. Condon

Figure 10. *The Causmag, lime and salt supplement increased liveweights of lambs grazing Wedgetail wheat by 30-50%.*

Causmag, lime and salt supplement offered in the supplementary feeding trial at Wallendbeen, 2005.

Photo: K. Condon

Figure 11. *The oaten straw supplement did not significantly increase liveweights of lambs grazing Wedgetail wheat, although straw intake was low.*

Oaten straw supplement offered in the supplementary feeding trial at Wallendbeen, 2005.

Photo: K. Durham

Figure 12. *Due to drought conditions, yield was sacrificed for liveweight responses at the Marrar supplementary feeding trial.*

Supplementary feeding trial at Marrar, September 2006.

- Results from both trials showed liveweight gain responses of 30-50% in sheep offered mineral supplements based on Causmag (MgO), lime ($CaCO_3$) and salt (NaCl). However as the wheat contained more than adequate levels of calcium (Ca) for animal requirements, it is assumed the response was due mainly to the magnesium (Mg) in Causmag and the sodium (Na) in salt. There were no significant liveweight responses to the oaten hay, although intake was very low.
- Analysis of the wheat grazed in the trials also showed high potassium (K) levels and very low sodium (Na) levels relative to animal requirements. Consequently, the K:Na ratios were very high which can greatly reduce magnesium (Mg) absorption from the rumen. Supplementing with sodium (Na) would therefore have decreased the K:Na ratio and improved magnesium (Mg) absorption, contributing partly to the sodium response.
- With a magnesium (Mg) and sodium (Na) supplement costing 1c/sheep/day, returning approximately $1.60/kg in liveweight gain at the time of the project, the large economic response suggests that livestock on grazing wheats should be routinely supplemented with MgO (eg. Causmag) and NaCl (salt) at the ratio of 1:1.

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Table 4. Feed supplements & liveweights

Wallendbeen 2005 - 529mm in-crop rain

Commercially sown Wedgetail paddock grazed with XB lambs from 11th July to 25th August at 25-35 DSE/ha, supplements offered ad-lib.

Supplement	Nil wheat only	Minerals magnesium + calcium + salt	Oaten hay
Crude protein (% DM)	22%	–	3%
Neutral detergent fibre (% DM)	49%	–	80%
Digestibility (% in vitro)	75%	–	41%
% Wheat in diet	99%	99%	89%
Feed intake (g/day)	1371[a]	1542[a]	1220[a]
Liveweight gain (g/day)	184[a]	283[bc]	225[ac]

Marrar 2006 - 134mm in-crop rain

Commercially sown Wedgetail paddock grazed with XB lambs from 21st August to 18th September at 20 DSE/ha (yield sacrificed for animal responses), supplements offered ad-lib.

Supplement	Nil wheat only	Minerals magnesium + calcium + salt	Minerals + oaten hay	Magnesium + oaten hay
Crude protein (% DM)	24%	21%	24%	23%
Neutral detergent fibre (% DM)	51%	47%	49%	48%
Digestibility (% in vitro)	76%	80%	78%	78%
% Wheat in diet	-	100%	98%	98%
Feed intake (g/day)	-	890[a]	1097[a]	897[a]
Liveweight gain (g/day)	132[a]	163[ab]	185[b]	174[b]

Results followed by the same letter are not significantly different.

Grazing canola... best-bet management

The potential to utilise canola as a dual purpose crop was initially investigated by CSIRO in 2004, with best-bet management practices developed through a GRDC funded project commencing in 2006. The project found:

- Dual purpose canola can produce similar benefits as dual-purpose wheats, while also providing a break crop for weed and disease management.
- Canola varieties sown two to three weeks earlier than normal (early to mid April) can be grazed in winter before bud elongation, with no impact on yield or oil.

The success of dual purpose canola depends on a number of key management principles, as follows:

- **Paddock selection and sowing time:**
  - Paddocks should be well prepared for early sowing, with adequate subsoil moisture to ensure even establishment and early dry matter.
  - Early sowing in early to mid April can produce 1.5 to 3t/ha dry matter in the critical winter feed gap, allowing resting of winter pastures.
- **Variety choice:**
  - Although most commercial varieties can be used as dual-purpose, best results are achieved with early sown, mid-late maturing varieties, with high early vigour and good blackleg resistance (R rating), with grazing increasing blackleg severity.
  - Consideration of herbicide tolerant varieties should take into account limited weed management opportunities with early sowing, as well as grazing withholding periods.
- **Crop management:**
  - Strategies to maximise early dry matter for grazing include:
    - early sowing
    - crop type (hybrids tend to produce more dry matter, triazines least)
    - higher plant density (at least 50 plants/m^2)
    - adequate nitrogen, but be aware of nitrate poisoning in stock on recently fertilised crops.
- **Grazing management and stock health:**
  - Grazing can commence as soon as plants are well anchored, although feed availability (greater than 1.5t/ha) and chemical withholding periods usually prevent the start of grazing until the 6-8 leaf stage, or mid-June for early April sowings.
  - Canola is palatable to stock, has high feed value and has produced liveweight gains up to 300g/day. High stock numbers are required to utilise available feed.
  - No animal health issues were reported during the project, but guidelines for grazing of forage brassicas should be followed.
  - Stock should be removed before bud elongation (>10cm) to avoid delays in flowering and yield or oil penalties, although consideration may be given to yield compromises if livestock returns are high. Good grazing management and optimal seasonal conditions for regrowth will maximise yield recovery.
- **Profitability and benefits:**
  - Commercial dual purpose canola crops monitored during the project period showed most achieved 600-800 DSE grazing days/ha from mid-June to late July. Although various animal classes were used, profitability on such high value feed is generally greater with meat enterprises.
  - Other indirect benefits of dual purpose canola include:
    - reduced crop height and bulk for easier windrowing/harvesting
    - grass weed control
    - disease break
    - spelling of winter pastures
    - flexible management

Reference:

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For further information:
ph: (02) 6924 4633
farmlink@farmlink.com.au
www.farmlink.com.au