



Grazing Crops Forum



Monday 26th September 2011

The Guildford Landing (114 Swan St, Guildford)



Grains
Research &
Development
Corporation



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Department of
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Facilitator Summary

The Grain and Graze 2 Grazing Crops Forum attracted 30 farmers, consultants and researchers. All were experienced in the use of grazing crops in the WA farming system.

The desired outcomes for the day were developed from a mixture of Grain and Graze 2 Relative Advantage project outcomes and from feedback from leading farmers, researchers and agronomists across the State.

This forum built on a meeting hosted by the Department of Agriculture and Food in December 2010 of all parties who had done, or were doing grazing crop research and/or demonstrations in WA. This meeting led to greater cooperation during 2011.

The majority of the desired outcomes anticipated for the forum were met. (A list of outcomes is detailed on page 5 of this report.)

- There was an environment for the two-way flow of information between farmers, agronomists and researchers; and this was noted in the evaluation sheets completed at the end of the day.
- It is hoped there will be greater cooperation and collaboration between organisations researching and demonstrating grazing crops in WA. There was input into the CSIRO and Grain and Graze 2 projects from the farmers and agronomists in the room; and DAFWA researchers left the forum with a greater understanding of how their contribution can best be used to develop grazing crops in WA. This was noted in the forum notes and evaluation sheets.
- The possibility of a 'home/central hub' for grazing crops in WA was discussed by the group, but no group or agency formally accepted this challenge. It was decided that it would still be an informal network of interested farmers/researchers; and that the Bridging the Yield Gap website was probably the best place to put information regarding grazing crops.
- A formal network of interested farmers, agronomists and researchers was not developed as a result of the day, however an informal network has now been established and it will be interesting to see how this develops.

The key questions that were posed by the day were answered clearly by each speaker. They were;

- How do grazing crops fit in the WA farming system?
- What are the key issues on WA farms regarding grazing crops?
- What is the current state-of-play with research in WA in grazing crops?
- Where do we head with what we know, and what we need to know? (Setting priorities and research/demonstration questions.)

I believe that the answers to these questions (as documented in this report) provide a clear direction for the industry to channel its investment into the area of grazing crops. As the industry becomes more mature in its use of grazing crops, these key questions (and their answers) will change, and it will be the responsibility of the informal network to ensure they remain relevant.

There were some key issues/opportunities that were repeatedly identified by the forum regarding grazing crops in WA, and as such could form a priority list. They were;

- A lack of clear understanding and promotion about chemical with-holding periods and crop grazing
- The role of grazing crops in the low to medium rainfall zones (and the industry understanding/research to support the practice in these areas)

- A matrix or decision support tool which studies crop x variety x region x crop stage and grazing interaction. (It is believed that some of the data would already be available to begin to populate it, and it would be handy to have it all in one place.)

Grain and Graze 2 Relative Advantage comments

Because of the mix (all participants were experienced in the use of grazing crops in the WA farming system), very few of the disadvantages of grazing crops were discussed. But when they were, the forum participants commented on how they had overcome the issues.

For example, the issue of reduced crop yield was discussed by each of the speakers and was brought-up again during the forum at the end of the day. It was recognised by the forum that many croppers would not consider grazing crops because of this fact, and that the practice would not be for every farmer in WA (especially those who don't have sheep or livestock). The growers at the forum said the hardest bit of adopting the technology was opening the gate to the sheep, especially when it was a really good crop, but to have faith in the science and the season. The forum also recognised that it was important to plant extra area of crop to compensate for the loss of yield in grazed paddocks, suggesting that the extra grazing gained from the crop also compensated for the loss of pasture area. This is where the systems modelling being undertaken by CSIRO and Grain and Graze 2 will be important to document some of these whole-farm decisions.

There were two comments from different participants regarding the practice of grazing crops and its relationship to WA farming businesses that resonated with the forum. They were;

- “For the 70% crop: 30% livestock business; grazing crops may help them stay in sheep just as no-till helped the livestock people get into crop.”

Both farmers and researchers alike indicated the necessity for an ‘easy sheep system’ in WA agriculture. It appears that grazing crops may be a helpful tool for some businesses, especially at the whole-farm level.

- “In lower rainfall areas dual-purpose crops may be more suited to fill winter feed deficits. Whereas in higher rainfall areas, feedbase benefits are more likely to come from pasture deferment.”

The use of grazing crops will be many things to many farming businesses, but for the economic modellers, the cost of feed in the different areas is reflected in this comment. It highlights the necessity for the industry to better understand how grazing crops fits into lower rainfall areas.

Evaluation

A further evaluation will be undertaken by the Grain and Graze 2 Relative Advantage Project Officer two months after the Forum to determine if the outcomes of the Forum had been met, or what could have been done differently. This will be done via a short phone survey with a total of six participants (two farmers, two agronomists and two researchers). The results of this survey will be outlined in the Grain and Graze 2 Annual Report.

Danielle England, Planfarm Pty Ltd, Narrogin

Background

Aim

The forum aimed to bring together a group of 40 people from across the State to share their experiences and ideas regarding how grazing crops are used on WA farms.

Outcomes of the day

- To create an environment for the two-way flow of information between farmers, agronomists and researchers.
- To develop a network of interested farmers, agronomists and researchers
- To develop greater cooperation and collaboration between organisations researching and demonstrating grazing crops.
- To discuss the possibility of a 'home/central hub' for grazing crops in WA.

Key questions to be answered:

- How do grazing crops fit in the WA farming system?
- What are the key issues on WA farms regarding grazing crops?
- What is the current state-of-play with research in WA in grazing crops?
- Where do we head with what we know, and what we need to know? (Setting priorities and research/demonstration questions.)

Participants

Participants were a mix of farmers, consultants (including private agronomists) and researchers. The invitation list was compiled of people who were using grazing crops in their business, or who had experience in researching, demonstrating or recommending grazing crops. A full list of participants can be found in Appendix 2.

Participants were mixed amongst the tables, with the tables forming the discussion groups. An even spread of farmers, consultants and researchers in each of the groups ensured different views were captured during the different activities.

Introductions – the total area of crops grazed in 2011 per table

Yellow dots – 1200ha

Blue dots

Red dots

Green dots

White dots

See stories in appendix 2.

Collecting the Relative Advantage of Grazing Crops

Relative Advantage

Grain and Graze 2, through its activities, aims to outline the 'relative advantage' of different tools/farming techniques that will aid the interaction of the grazing and cropping enterprises within whole-farm businesses.

The *Relative Advantage* is the advantage a farming technique may bring to a farming business. It recognises that the adoption of a different tool may not be absolutely advantageous to a business, but that it is likely to also have its negatives that must be considered during the practice change. For each business this will be different. The responsibility of Grain and Graze 2 is to provide all the information (both positive and negative) on a tool/farming technique to allow farmers to determine if it fits their farming system.

Grazing Crops Forum

This forum invited participants with experience in grazing crops. It gave them an opportunity to come together and swap stories about how the tool/technique is being used on their farm. To facilitate this process, the day's program included lots of opportunity for discussion, and a break-out spot were available in another area for more in-depth discussion between individuals.

The relative advantages (and disadvantages) were discussed by the speakers, and discussed and documented during the panel sessions. These discussions added to the final session which began to identify future opportunities for grazing crops in WA.

Copies of research and demonstration results were welcomed, and room made available for displays. This was taken-up by Grain and Graze 2 and DAFWA.

Session 1

A full copy of the presentations can be found in Appendix 4.

Speakers:

Simon Fowler, Chillwell, Condingup
Angus Sellars, Esperance Rural Supplies
Dale Cronin, Dumbleyung
Luke Ledwith, Kulin (presented by Jonathan England, DAFWA, Narrogin)
Don Nairne, Binu (presented by Richard Quinlan, Planfarm, Geraldton)

Other farmer presentations during the forum: David Cox (Session 3)

Speaker Summaries

Simon Fowler

- The future of grazing crops;
 - We are very confident with cereal grazing
 - More research is required on canola grazing in relation to both yield impacts and animal health/performance issues.
 - More research is required on extra nitrogen requirements after grazing on all crops
 - More research is required in lower rainfall zones.

Angus Sellars

- Where my clients are at today;
 - Most of my clients that have stock are grazing crops
 - All are grazing cereals and trialling the grazing of canola
 - Working it into the whole farm system

Angus Sellars cont -

- What have we learnt
 - Cereals
 - Select varieties that are suited to your environment for maximum grain yield
 - Graze to hollow stem but watch flowering length
 - Some longer season types have a role when pushing the system
 - Will give better livestock weight gain
 - Remember weed control
 - Canola
 - Again, select varieties that yield in your environment
 - Know your maturity; length of time for flowering is most important with grazing canola
 - If you have early moisture, canola has the advantage of more weed management options
 - Think about the different canola systems
- Where are we going with Grazing Crops
 - Clients that have started grazing crops will keep pushing and refine the system as confidence grows
 - Adapting farms to maximise the grazing opportunities
 - Cropping farmers that still have the infrastructure can increase livestock numbers; livestock operation will be increasing cropped areas.
- We have proved that you can graze crops with minimal to no yield effects. It is how you can fit it into an individual operation.

Dale Cronin

- Problems
 - Hard to control capeweed, fumitory, raddish in crop
 - Sheep like to camp in certain areas (an electric fence may overcome this)
 - More nitrogen would have increase growth
 - Need to time spraying to control raddish, grasses and not to reduce seed set of Losa
 - Need to decide to crop, or leave to pasture next year (clover seed set)
- Benefits
 - A way to get income while increasing clover composition in pasture
 - Lambs seem to do very well
 - Pasture in other paddocks is being deferred
 - Later in the year the opportunity to manipulate paddocks knowing you have the extra feed
 - Good opportunity to reduce weed burden of a paddock.
- Things to try next year
 - Rye corn looks impressive at the moment
 - Dry seeding canola and clover with Aloska
 - Dry seeding canola into clover dominate pasture
 - Improve practices and measuring for grazing ewes on early sown barley paddocks
- To increase profits need to have a plan to increase stock numbers or cropping area knowing you have the extra fodder.
- Or decide to manipulate other pastures harder and earlier than normal.

Luke Ledwith

- Key points (canola)
 - Wean lambs onto for high, healthy growth rates (in dry years it will be a saving on grain)
 - Earlier the start, the more canola we will seed, and we may get a yield too
 - It will stay green into the summer if rain continues
 - Manipulate the pasture to set-up for cropping, taking out the competition and disease, leaving high FOO
- How grazing fits at Kolindale
 - No profit in grassy crops
 - Need all clover pastures (nitrogen fixation)
 - 30-40% lambs scanned in twin (twin ewes need 23-27mj a day), => instead of spending \$ on ad-lib feeders, use it to clean early crops (?)
 - Put all twin ewes on crops to allow clover pastures to get away (more feed in the Spring)
 - Seed an extra paddock of barley if you think there is a yield penalty over your average of years. To have no yield loss + the graze + the extra stubble after harvest.

Don Nairne

- Still to be investigated
 - Wheat varieties suited to grazing in local area. Need hybrid type wheats with better seeding vigour.
 - Can grazing cereals contribute to weed control? If so, can we develop a system for that?
 - Grazing crops and leaf diseases
 - Grain and Graze Programme – Grazing crops can contribute to better livestock management. I consider that grazing crops has enabled me to cease mulesing on my farm.
- 2011 Project
 - Dry sow forage Dictator barley
 - Multi-graze hard – 4 grazes from 11/6 – 3/8.
 - Sprayed out completely, then resown with forage brassicas. This year used Pulsar forage rate and Pacer leafy turnip. (Hoping it will reach grazing stage in 42 days (mid-October)).

David Cox

- Increased livestock returns by grazing crops

Relative Advantage Discussion 1

- Economic benefits obvious at the whole farm level
 - How do we do it better?
 - Dry matter value
 - Livestock growth rate values
 - Extra crop area
 - Ewe/lamb values
 - Pasture growth rate values
 - Whole-farm bio-economic analysis
- Looking at the yield loss and trial data – most growers are not interested
 - Better reporting of trial data
- Economic drivers
 - Not pasture
 - Extra crop in the ground
 - Dry years – extra feed
 - Good years – extra crop
- Good rules of thumb
- Each farm will be different
- Hard to quantify livestock and pasture gains
- Dry sheep vs lambing ewes
 - Matching crops to livestock class
- Work out how it fits your system



Session 2

A full copy of the presentations can be found in Appendix 4.

Speakers:

Mark Seymour, DAFWA Esperance
Matt Ryan, DAFWA, Esperance
Andrea Hills, DAFWA, Esperance
Stephen Gherardi, DAFWA, South Perth
Phil Barrett-Lennard, Grain and Graze 2 WA
Dean Thomas, CSIRO, Perth

Speaker Summaries

Mark Seymour/ Matt Ryan

- Canola, wheat and barley trials outlined
- Cattle trial outlined
- Key messages
 - Less of a growth check on cereals compared to canola (particularly important in growing stock)
 - Clip grazing phase was more productive for growing stock
 - There is an obvious adaptation period
 - Two weeks for cattle grazing canola
 - Possible solutions – pre adaptation of use breeding stock
 - We did not observe any health issues however there are a number of possible problems when grazing brassicas.
 - Nitrate poisoning
 - Goitre (iodine poisoning)
 - 5 methyl cysteine sulfoxide SMCO damages red blood cell membrane causing haemoglobin leakage from cells
- What we have learnt
 - Managing WHPs is difficult
 - Need to use bare seed
 - Timing of post-emergent herbicides is problematic
 - Need to get more than 2 weeks grazing on canola (or view them as holding paddocks)
 - 46Y20 RR (Mid-Late) seems right maturity for April 15 sowing
 - Or plan canola paddocks so they are ready at different times and animals can move from one to the other – the cost of delayed sowing may sometimes outweigh animal benefits
 - Longer season canola lines are safe to graze for longer but unlikely to yield well in WA
 - April sown spring cereals is problematic
 - Development rushes
 - Ready at relatively low biomass in mid -May and prior to the end of many seed dressing WHP's
 - Wedgetail wheat and Urambie/Gardiner barley development suits April sowing in WA
 - Vlamingh seems to be recovering ok

Mark Seymour/ Matt Ryan cont-

- Pushing animals hard increases amount of stem eaten which may reduce potential growth rates
- Clipping crops seems less risky at a wider range of development stages and may give best animal performance – provided stock are mobile
 - Does not necessarily need April sowing to make it work
 - Large areas grazed a little
- Need to manage the pasture when the animals are on the crops so they can return to a good plane of nutrition
- Future activities
 - Need to adapt the system so it suits WA
 - Bringing the activity into the mainstream
 - Grazing May-sown crops
 - When to stop
 - Clip vs crash grazing
 - Height x time of grazing x frequency/length trials
 - Maximising animal performance whilst on crops and when they go back to pasture
 - Extending time on crops – in particular canola
 - Improving pasture deferment
 - Clip vs crash grazing
 - Crop development database
 - Update flower models to include Z30?
 - Need a slightly longer wheat variety (9 weeks to ear at 1cm from April sowing)
 - Better system for April sowing/Seedling vigour for April sowing

Andrea Hills

- How grazing affects disease management in barley
- Grazing reduces disease levels
 - A week after grazing finished (27 July), the top leaf had less than 1% disease on it while the ungrazed was 20% diseased.
 - Average for grazed was 12% and 53% for ungrazed (top 3 leaves).
- Post grazing disease levels
 - After grazing finished on July 25th, powdery mildew levels increased and needed to be controlled by fungicide
- Conclusions
 - Grazing will decrease disease levels on the top leaves.
 - If lower leaves are not grazed they will still become severely infected.
 - After grazing, under high disease pressure, grazed barley needed spraying to control powdery mildew – but it was significantly better than using a dud seed dressing and leaving the barley ungrazed.
 - 2011 was an extremely high pressure season for powdery mildew (a three spray season, not two!)

Stephen Gherardi

- Objectives
 - Measure the production from sheep (condition score, liveweight and grazing days/ha) grazing a standing cereal or canola crop
 - Compare the yield and quality of grazed crops with ungrazed crops
 - Undertake a gross margin analysis to calculate the potential benefits of grazing crops
- A 2011 Bridging the Yield Gap survey of the largest 50% of grain farmers (by production) (n=300) showed that 47% of respondents had a medium to high interest in 'grazing of crops'
- Where to from here
 - Grazing crop strategies for different regions?
 - Are there particular varieties of crops we should not be grazing?
 - Can we define windows for the grazing of particular crops/varieties?
 - How variable is the production response of sheep on particular crops and when they move from crop to crop and crop to pasture?
 - How do we best service the requirements of those wishing to learn more about the grazing of crops?

Phil Barrett-Lennard

- Grazing crops
 - 8 paired paddock demo's
 - 3 x Geraldton area (Richard Quinlan)
 - 2 x Kojonup area (Sam Taylor)
 - 3 x Esperance area (Greg Warren)
 - 1 whole farm economic analysis (FSAS)
 - Work to be conducted by Andrew Bathgate and John Young
 - Analysis to focus on Great Southern and Central Wheatbelt to examine contrasting systems (perhaps should be South East Coast for greater contrast...?)
 - Analysis to examine macro factors first (year 1) and then examine micro factors (years 2 & 3).

Dean Thomas

- Integration group objectives
 - Use simulation modelling and related tools to analyse key management practices to identify production-NRM-risk trade-offs and synergies for integrated crop and livestock enterprises:
 - Management options and decision rules for grazing dual-purpose cereals in the lower-rainfall parts of the cereal-livestock zone
 - Management strategies for timing the grazing of different elements of the feedbase on mixed farms
 - Business and NRM risks and opportunities associated with pasture-cropping
 - Water use efficiency effects of managing the crop-pasture transition
 - Interact closely with the regional project teams in Grain and Graze and also with other RD&E initiatives, including GRDC's Water Use Efficiency program
- Conclusions
 - Dual-purpose crops can reduce the early winter feed-gap in Western Australia
 - The complementary nature of dual-purpose wheat as a component of the feedbase will be affected by farm location

Dean Thomas cont-

- In lower rainfall areas dual-purpose crops may be more suited to fill winter feed deficits. Whereas in higher rainfall areas, feedbase benefits are more likely to come from pasture deferment

Relative Advantage Discussion 2

- Canola
 - Plant density
 - Not much difference in results
 - Different density trials?
- Variable grazing – impacts on response
- Deferred grazing
 - Definition by the group = *not grazing from the start of the season*
- Resting pastures in winter
 - Definition by the group = *grazing at the start of the season, resting in mid-winter*
 - This is what people were talking about in this forum regarding grazing crops
- Issues with deferment
 - Poor start – nothing grows
 - Traditionally you are favouring crops to harm pastures
 - However by sowing extra crop area to cover the feed/FOO required in early winter, there are benefits to grain tonnages and pasture and livestock growth rates
- Winter crops vs Spring Crops (grazing and yield differences)
 - Potential for different varieties
 - Genetic development
- Winter varieties
 - 'Proper' work on winter growth in WA
 - Most suited to the dairy farmers
- HRZ breeding zone trials
 - Plant breeder trial sowing dates
- It highlights how far we've got to go with breeding work; we've been breeding wheat plants for grain production only. Never looked at grazing and grain producing qualities
 - High vigour varieties
- Animal acclimatisation to grazing crops (as shown in the cattle trials at Esperance Downs Research Station trials)
 - What can we do about it? Pre-exposure, behaviour
 - Health issues associated with grazing a monoculture
- Runs in cattle in canola. Seasonal variation noticed
- Gut-fill at measurement and weighing animals on and off crops
 - And its effect on published growth rates
- Systems modelling
 - Scenarios corresponding
 - Dynamics of systems being captured
 - Dean and regional case studies to be included in Grain and Graze 2 work
 - Location of sites – need Katanning in the mix.

Grazing Crop Development

A Rubric¹ was developed at the beginning of the forum that outlined tools/technologies and practices that had been successfully (or not so successfully) implemented in WA farming businesses; and what were their attributes. No-till and lick feeders were given as examples.

Later in the forum participants were asked to fit grazing crops into this Rubric, and to think about what was needed to support the practice in WA (to lift it into the 'good' column). This was then discussed and documented within the small groups.

Table 1 - Attributes of different technologies that have been implemented on-farm

Good -	Medium – “So-So”	Bad – not adopted – “Dud”
Examples No-Till, VRT	RR Canola, Chaff Carts, Lucerne Establishment, VRT, GM crops	Lure H2O, ASBVs, Electronic Ear Tags
Erosion control/environmental concern/care	Some good attributes	Expensive
Timeliness (crop in on time)	Increased risk	No direct return on investment
Scale - scalability	Hard to establish	Associated infrastructure required
Labour efficiency (3)	Opportunity cost	No change in the business as a result
Moisture conservation	NRM benefits	Voluntary
Easy to use	Competes with crop	Need for more trials
Productivity benefits	Stand life is short – density decline	Variable results
ROI	Bugs	Cost
Capital cost	Community acceptance “not quite there”	Always one limiting factor – eg. Water
Efficiency – saves time	Complicated	Traditional industry
Obvious advantages	Not quite proven	Voluntary vs mandatory
Easier	Situational	Expensive
Initial kick-start requires intuition – eg need an outsider with a different frame of mind	Good benefits, but still negatives	Needs associated infrastructure
Mass	Good benefits – but still risks	Not reliable
Benefits to everyone (all involved) herbicide, machinery sales)	Negative community perception	Not changes as result of implementation
Broad network of like-minded people & support		Seasonal variance
Multiple advantages – labour, time, fuel savings		
Champions		
Demonstrations with obvious results (2)		
Need to be in a position to change the business		
Low capital – cost of entry		
Good product – easy adoption		
Easy to see the results		
Marketing advantages		

¹ A rubric is a set of criteria and standards typically linked to objectives that is used to assess or communicate about product, performance, or process tasks. (They are traditionally used in the education system to support student self-reflection and self-assessment as well as communication between assessor and assessee.) A rubric can also provide a basis for self-evaluation, reflection, and peer review. A rubric can best support the learning process when it is shared at the beginning of task creation or development process. Pamela Flash states that “When students are apprised of grading criteria from the start, they can be more involved in the process of working toward success.” (Adapted from Wikipedia.)

Rubric wrap-up

Participants were asked;

- Where do grazing crops fit in the Rubric? Why?
- What are your top three ideas to make it into the 'good' column

General consensus

Medium fit

Medium -> Good

Good

There are two markets – the mixed farmers who would rate it good -> medium and croppers who would rate it poor.

Table 2 - Attributes of grazing crops

Good	So-So	Dud
Reversability	Yield penalty when grazed late/poor spring	Always one limiting factor – eg. Water
Zero capital cost	Easy to implement	<ul style="list-style-type: none"> • Croppers <ul style="list-style-type: none"> • Lack of infrastructure • Expensive to trial • NOT TARGET MARKET • ONLY AIMED AT MIXED FARMERS – livestock and crops
Positive side effects (disease suppression/WUE)	Evaluation harder at whole-farm level	
No associated infrastructure	Needs to be more fool-proof. - Here's the rule book	
Easy to implement and evaluate – paddock scale, harder at the whole farm	Where can I go to get support or find information? - Website needed	
Good rigorous research		
Champions available		
Easy to use (confidence)		
Cheap to implement (if you have stock – if you don't then you wouldn't use it)		
No barrier to reversing		
No associated information is required		

Attributes of the technology and ways to move it into the 'good'

- 70% crop: 30% livestock – may help them stay in sheep just as no-till helped the livestock people get into crop
- Champions
 - Need more in different areas
 - Support for champions
- Economics not clear – needs to be valued correctly
- Positive side-effects (eg disease control)
 - Couple of main reasons to graze crops – but there are added benefits
 - Opposite too
- No merchandise push – nothing saleable, except may be with the seed merchants.
- High livestock prices – may encourage people in
- Key rules and attributes
 - There is a yield penalty if you get it wrong
- Seasonal unknowns
 - Requirement for flexibility
 - Risk management strategy
- Opportunistic
- Exit strategies
- Should strive for it to be a routine part of the business
- It is a tool for the good seasons – maximise crop returns by planting extra area
- Paired-paddock is OK
- Individual farmer is harder
- Keep the messages simple
- Why aren't the agronomists encouraging it
- Develop a critical mass of farmers
 - Different areas
 - Use those farmers who have already embraced it
- Need to train more champions
- Need a critical mass of adopters
- Needs to be made fool-proof
- More value on livestock benefit and less on crop penalty
- There are no sales of product – so it is hard to get the whole industry on-board
- Higher livestock prices
- List of all the positive benefits

Grazing Crop Forum Outcomes

A forum was held after lunch to capture the industry's current research and demonstration priorities and questions.

The groups were asked to answer the following questions regarding Grazing Crops in their groups:

1. What are your top ten issues/opportunities
2. What are the top five questions/knowledge gaps still to be answered
3. What are the top five future ideas you have

Issues/Opportunities

- Low rainfall zone opportunities
- Crop and pasture relationships
 - Increased crop, increased stock
 - Grow more crop without reducing stock numbers
 - Maintain stock numbers, but on a reduced area
- Risk
 - Improved profit, reduced risk
 - Manage risk
 - Diversity of income
 - Risk free grazing crop program
 - If you plant it you can harvest it (if the season turns out, if you don't plant it, you can't harvest it)
 - Minimising risk and feed supply
 - It's a stock grazing system to maximise benefits
 - Grazing crops – try it – it doesn't cost anything; you're not suck with it (eg chaff cart)
 - Free feed people are not using
 - Share farming
- Crop management
 - Changing flowering time – frost advantage
 - Canopy management – water use at the end of the year; disease control; canola – increased efficiencies
 - Canola as a pasture
- Early sowing
 - Perception that to graze it needs to be early sown – opportunities for tailoring sowing dates for different regions
 - Increased early sowing
- Soils
 - Soil compaction and Erosion on sandy soils
- Nitrogen
 - Substituting fossil nitrogen for legume nitrogen
- Weeds
 - Weeds stimulated by grazing; seed germination
 - RR canola to control weeds
 - More crop damage; spraying crop grazed
 - Chance increase weed numbers – managing grass weeds in cereals
 - Weed management – RR crop opened up – broadleaves in cereals
 - Opportunity to control broadleaf weeds in cereals

- Disease management
 - Decreased diseases (cereal)
 - Improved canopy management
- Livestock
 - Increased live weight gain in stock
 - Finishing stock and earlier
 - Moving lambing window corresponds with grazing
 - Animal health issues in highly intensive livestock environment
 - Not enough fat in fast growing lambs
- Supplementary feeding
 - Replacement of supplementary feed in a poor season
- Clipping (the top off crops) vs crash grazing
- Pasture management
 - Spell pastures
 - Resting of pasture
 - Early crop vigour vs pasture vigour (availability)
 - Pasture rest/deferment
 - Increased legumes in the pasture - \$ in the first year
 - How much clover seed production do you need to be able to crop next year
- Information collation
 - Compilation of current information
 - Concept growing degree days to predict crop (vegetative -> reproductive)
- People things
 - Mindset – people need to get comfortable
 - Time intensive enterprise – NAR – or if you are a cropper anywhere
 - Consumer acceptance of grazing GM crops



Questions/Knowledge Gaps

- Withholding periods
 - Withholding periods and MRL – needs research
 - Withholding periods of chemicals
 - Justification of withholding periods
- Crops stages and growth rates
 - Early sown spring cereals – tillering >GS 30
 - Grazing vs Flowering vs Variety vs Region for Canola
 - Genetics x environment x season
 - Variety x dry matter – and growth curves
- LRZ
 - Livestock in LRZ and where grazing crops fit
 - Application to low rainfall areas
 - Ideal system in low rainfall area
- Livestock
 - Animal behaviour/selectivity
 - Understand rumen adaptation to canola (How much they will eat and grow)
 - FOO vs intake
 - How do you allow for gut-fill in research
- Economics
 - Profit of different G&G systems
 - Whole farm economics – quantifying profit for/from grazing
- WUE of grazed vs ungrazed crops
- Canola
 - What role does plant density play in grazing canola
 - Grazing brassicas – what's their suit/fit in WA (eg blackleg)
- Soils
 - Soil compaction (particularly in no-till)
 - Effect of grazing on waterlogged paddocks
 - What does it do to soil carbon
- Weeds
 - Weed recovery vs crop recovery (competitive advantage of weeds over crops)
- Nutrition
 - Nitrogen requirement after grazing
- Farm infrastructure (eg water)
- Skills and attitudes
- Optimising crop performance under dry sowing and/or very early sowing
- How big is this grazing crops thing going to get? (Numbers using it – do nothing, support required, considering BYG survey)

Future Ideas

- Case study farms – benchmark for 5 years
- Winter malting barley
- Paddock sign
- Training animals to eat canola
- Crops as pastures (especially Low Rainfall Zone)
 - IT, RR canola, forage brassicas, cereals
- Development of a website to make available (Prediction crop vegetative to reproductive stages)
- Breed varieties with longer vegetative period that are suitable for grazing
- Who pays for designing systems suitable for grain and graze?
- Twin sowing, crop/legume (graze crop and then knock-out legumes)
- Web page with database about dual purpose crops
- Breeding – grazing useful traits (eg early vigour, winter vernalisation, upright growth)
- Optimising dry matter production (varieties, seed rates, fertiliser strategies)
- Under-sowing: increasing legumes in crops
- Grazing legumes (eg peas, lupins)
- Trial/demo – followed all the way through; grazing crop economics vs supplementary feeding
- Technology to move sheep from paddock to paddock



Key opportunities for directions forwards for the practice of Grazing Crops in WA

Key questions/opportunities of the group

1. With holding periods and MRL guidelines
 - a. Easy rules in the blue book
2. Crop x variety x region x crop stage
 - a. Decision making matrix re grazing times, sowing dates and rainfall/seasonal info
3. Economics at the whole farm (Dean Thomas, Phil Barrett-Lennard and Mike Ewing)
 - a. And adjustments depending on experience
 - i. Linking to champions and redefining transects
4. Research
 - a. Water Use Efficiency
 - b. Soils
5. Low Rainfall System
 - a. Pathways to Resilience (DAFWA)
 - b. Dave Kessell – MLA \$
 - c. Phil Barrett-Lennard – AWI \$
6. Novel livestock systems
 - a. Exploration of not using pastures, only crops
 - b. Thinking of supply chain opportunities
7. 2012 Crop Updates
 - a. Forum second afternoon.
 - i. Farmer presenting (suggested Fowlers)
 - ii. Farmer chairing
 - b. Outline the opportunities for mixed farmers
 - c. Target agronomists
 - d. Key recipes (sound ideas) from agronomist
 - i. May come from other info (ie from paper)
 - ii. Bend thinking towards grazing crops
 - iii. General support gained through farmer examples
 - e. Responsible
 - i. Mike Ewing
 - ii. Phil Barrett-Lennard
 - iii. Greg Warren
 - iv. Simon Fowler

Other opportunities

1. Demonstration sites
 - a. Grain and Graze 2 sites continuing
 - b. DAFWA support for sites available
2. The grazing crops 'blue book' will be revised during Grain and Graze 2 at a National level.
3. Ute guide to be developed. Simple recipe
4. Practice will grow itself – focus on mainstream
5. DAFWA programs
 - a. Interactions between grains and livestock
 - b. Bridging the Yield Gap and/or Pathways to Resilience opportunities
6. Grower groups
 - a. Support available from DAFWA and Grain and Graze 2
7. Linkages
 - a. GRDC, MLA, AWI
 - b. Grain and Graze 2, Making More from Sheep, Sheep's Back
8. Information available on website
 - a. Bridging the Yield Gap
 - b. Grain and Graze 2



Appendices

Appendix 1 - Agenda

7.45am	Coffee available	
8.00am	Welcome and GG2 introduction	Chair – Phil Barrett-Lennard
8.10am	Table introductions	
8.20am	Attributes of good technologies – <i>developing a scale</i>	
8.40am	Farmer experience – Simon Fowler (Esperance)	
9.00am	Agronomist experience – Angus Sellar (Esperance)	
9.20am	Farmer experiences <ul style="list-style-type: none"> - Dale Cronin (Dumbleyung) - Luke Ledwith (presented by Jonathan England) - Don Nairne (presented by Richard Quinlan) 	
9.50am	Panel session – <i>Collation of Relative Advantages/Disadvantages</i>	
10.10am	Morning tea	
10.30pm	DAFWA grazing crop trials - Mark Seymour – 2010 results & 2011 so far	Chair – John Wallace
10.50am	DAFWA barley breeding program - Andrea Hills – preliminary results of disease control	
11.10am	DAFWA Livestock Industries demonstration sites Steve Gherardi	
11.30am	Grain and Graze 2 demonstration sites Phil Barrett-Lennard	
11.50am	Grain and Graze 2 grazing crops modelling outcomes Dean Thomas (CSIRO)	
12.10pm	Panel session – <i>Collation of Relative Advantages/Disadvantages</i>	
12.30pm	Lunch	
1.15pm	Farmer experience – David Cox (Esperance)	Chair – Bob Hall
1.35pm	Grazing Crops Forum <i>An opportunity to discuss the past, the future, the issues and opportunities of grazing crops</i>	
2.35pm	Afternoon tea	
2.50pm	Collation of Forum Outcomes	
3.30pm	Evaluation of the forum	
3.45pm	Wrap-up and close	
4pm	Close	

Appendix 2 – Participants and their experience with grazing crops

1. Phil Barrett-Lennard (Agricultural Consultant, ag-Vivo, Gin Gin – GG2 Project Manager)
 1. 50ha Berkshire Triticale with cattle
2. David Bowran (DAFWA, Northam)
3. David Cox (Farmer, Esperance)
 1. Home farm nearly all crops are grazed
 2. Baudin, Urambie, Mace, Bonnie Rock, Wedgetail (last year of grazing), Canola
 3. Cattle adjustment and breeders = total 1000 - 2000 head
4. Dale Cronin (Farmer, Dumbleyung)
 1. 40ha Hotham oats; 100ha Bravo canola and Losa clover; 220ha Vlamingh barley; 16ha rye corn; 4ha forage brassica (380ha)
5. Danielle England (Project Officer, Planfarm Narrogin, GG2 Relative Advantage Project Officer)
6. Jonathan England (DAFWA, Narrogin)
 1. 3 demonstration sites (oats, wedgetail wheat, magenta wheat)
 2. 1 trial site (fodder clover, canola and SAMM Lambs)
7. Mike Ewing (GRDC, FFI representative)
8. Simon Fowler (farmer, Esperance)
 1. 500-600mm rainfall
 2. 6000ha grazed crops (10,000ha total cropped)
 3. All varieties (wheat, canola, barley)
 4. Used normal wheat varieties (Eagle Rock and Mace)
 5. 7th June – 10th August grazed
 6. Sale animals a priority – prime lambs and steers
9. Steve Gherardi (DAFWA South Perth)
 1. Demonstration site at Mike Cameron's, Kojonup
 2. 20ha TT canola with dry ewes; 1 week
 3. Pregnant ewes on a barley crop (Grain and Graze 2 – Sam Taylor)
10. Bob Hall (Farm Business Consultant, JRL Hall and Co, Darkan, GG2 committee representative)
 1. 5% clients grazing Wedgetail (early feed value)
 2. The poor seasons have put some farmers off (yield penalties)
 3. Mainly livestock farmers grazing still
11. Andrea Hills (DAFWA, Esperance)
12. David Kessell (DAFWA, South Perth)
 1. Grain and Graze 1 demonstration projects (stocking rate at Southern Brook and grazing wheats) (Grazing duration at Hines Hill)
13. Richard Quinlan (Consultant Agronomist, Planfarm, Geraldton)
 1. Binu - 500ha wheat; 300ha IT and TT canola; 30ha Dictator barley; Oats
 2. Mingenew – 105ha Wyalkatchem wheat
14. Matt Ryan (DAFWA, Esperance)
 1. Grazing canola and cereal trial with cows at Esperance Downs Research Station. (Looked at live weight gain and condition fat score at P8 site.)
15. Angus Sellars (Consultant Agronomist, Esperance Rural Supplies, Esperance)
 1. 12-13 clients who graze crops
16. Mark Seymour (DAFWA, Esperance)

1. Esperance Downs Research Station
 2. ~300 plots
 3. 20ha pasture measured; 13ha crops (barley, wheat, canola and pasture)
17. Dean Thomas (CSIRO Perth)
1. Pre-modelling study of Metabolisable Energy intake x 3 locations x 100 years
18. John Wallace (Farmer, Esperance, GG2 committee representative)
1. 520ha grazed out of 4000ha crop
 2. 12DSE/ha (<450mm rainfall) 1000ha winter-grazed pasture
 3. Baudin barley and Brusher oats grazed
19. Greg Warren (Consultant Agronomist, Farm and General, Esperance)
1. 11 clients with livestock. Rest all crop (80% clients)
 2. 200km² area around Esperance
20. Andrew Watts (Farmer, Wandering)
21. Peter White (DAFWA, South Perth)
22. Shaun Wittwer (Farmer, Cuballing)
1. 200ha Wandering Oats (3,000ha cropped)
 2. Grazed mid-May – mid-June with ewes with twins at foot

Appendix 3 – Forum Evaluation Results

Were your expectations met? *Why/why not*

- Yes (15)
- Broadly speaking – it dealt with strategic, tactics, drivers and adoption opportunities and challenges
- Good process to develop idea
- A lot of useful information about how dual-purpose crops are used
- Well structured, almost got to a perfect system (?)
- It opened more information on pros and cons of grazing
- Good learning
- No – no sheep production reps from grower groups like ASHEEP. Bit repetitive, no clear direction forward for Grain and Graze 2.
- No – only because of overall effects on farm profitability is still not easily calculated
- No – we still have no way of simply putting a value on grazing a crop => this is most important
- Good information from growers and researchers. Lots of new ideas

Rate the following using a 1 to 5 scale: 1 being the lowest, 5 being the highest (Please tick)

	1	2	3	4	5	Comments
Pace of the forum			4	8	7	Little bit rushed Very good To time!
Forum Content			3	11	4	
Facilitators / Presenters				13	5	Farmers were great
My participation		1	5	11	2	
Handouts	2	1	6	10	1	Couldn't read some
Venue & food				6	14	
My knowledge & skills on the topic before the forum			8	11		
My knowledge & skills on the topic after the forum				15	4	
My willingness to implement new knowledge & skills before the forum			3	12	3	
My willingness to implement new knowledge & skills the forum				10	8	More numbers from people doing it

What will you do differently as a result of this forum?

- Have a clear understanding of farmer go-to champions
- More extension of grazing barley crops. Also flowering/Z30 dates of standard varieties. Crop Updates paper
- Get out on-farm to measure more performance
- Talk about it in research forums, with growers
- Some modification of grazing systems analysis
- Seek to find survey for LR mixed farmers to take part in this technology
- Probably lamb earlier to capitalise on FOO increase, cropping area and research more information
- Greater collaboration DAFWA Livestock with BYG and P2R
- Maybe reduce research as it seems to be an extension effort
- Nothing I can think of. Maybe growing Urambi barley
- Not much
- Promote grazing crops more to clients

- Think about needs of main stream vs innovators – do the innovators need anything?
- Looking at how it fits in system, not just how we can put it in a paddock
- Consider whole-farm profitability when discussing pros and cons with clients
- A whole of farm approach to grazing rather than odd paddocks. Implement small amount of grazing on our low rainfall farm (300mm)
- Continue to push grazing system

The best part of today's forum was:

- The story contribution by farmer champions
- Food
- Range of people
- Ideas generation was good
- Growers innovative use of dual-purpose crops
- David Cox and Simon Fowler and Mark Seymour
- Meeting more like-minded people doing the same thing
- The discussion and looking at ways forward
- Hearing other people's work
- Simon's talk
- Informative, network with champions and economic reasons.
- Good participation by all
- Farmer presentations
- Farmer presentations
- Interaction
- Sharing ideas on where it fits. Changing perspectives. What makes a technology 'good', 'so/so', 'dud'
- Comparing where grazing crops fits into the category of 'good', 'so/so', 'dud' with the adoption of previous technologies
- Large farmers presenting on how they are implementing grazing – profitably
- Interaction with industry people and hearing their different perspectives and views.

Suggestions for future forums or Grain and Graze 2 events

- Need for detailed economic analysis if at least a few examples
- Wider variety of people?
- Biennial process with more data being translated into action statements
- Continuation of ?
- Similar format in another 12 months
- Repeat next year. If Elders, Wesfarmers etc still hold training days get Phil and Jonathan to give some talks
- As discussed
- Happy with the group suggestions
- Free dinner
- Collaboration with Grower Groups etc into systems in their areas
- Extension through Grower Groups (if information exists to suit each Group's environment)
- Photo slideshow of relative topics running during the breaks

Any other comments

- The atmosphere in the workshop was highly conducive to openness
- Well done. Commitment of growers and researchers was excellent
- Future support from R&D funders is unclear. (Specifically for ongoing activities in WA)
- Good day. Congratulations to G&G particularly Dani.

- Need Jonathan/Greg Warren etc type people in Low Rainfall areas
- Thanks Danielle. Excellent day!
- A simple concept that is being complicated by scientists and researchers
- Good day. Well done
- Dani is a good facilitator

Appendix 4 – Speaker Presentations



Grazing Crops - Chilwell

Aim of Grazing Crops

- To increase the profitability of our pasture phase by increasing DSE/WGHa.
- To aid in the finishing of sale animals.



Grazing Crops - Chilwell

What We Did

- In 2010 we grazed 1300ha of barley, 1930ha of wheat and 88ha of canola.
- In 2011 we grazed 1830ha of barley, 2650ha of wheat and 1625ha of canola.



Grazing Crops - Chilwell

What We Achieved

- In 2010 we increased stocking rate from 12 to 16 DSE/WGHa.
- In 2010 we increased income per winter grazed hectare from \$348 to \$466.
- In 2010 we planted an extra 1000ha of barley which yielded 3.77t/ha.
- In 2011 we increased our stocking rate to peak at 18DSE.
- Achieved good growth rates in young stock.

Weight Gain Trials

Stock	Crop Grazed	Grazing Period	Weight Gain
Steers	Wheat	25 days	1.45kg/hd/day
XB Lambs	Oats/Ryegrass	30 days	307g/hd/day
XB Lambs	Canola	21 days	273g/hd/day
XB Lambs	Barley	10 days	310g/hd/day
Heifers - Cull	Canola	20 days	631g/hd/day





Grazing Crops - Chilwell

What We Learnt

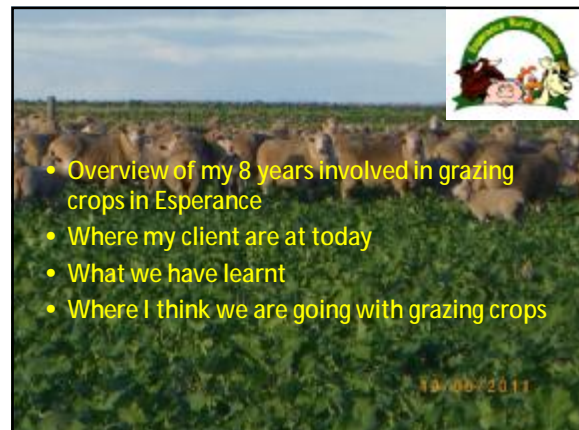
- Need to have good grass weed control in cereals.
- Only graze crops once.
- Leave some green leaf material to aid plant recovery.
- Remove animals at growth stage 30.
- Provide ad-lib straw to animals.
- Grazing crops is a vital tool in overcoming feed shortages in poor pasture growth years.

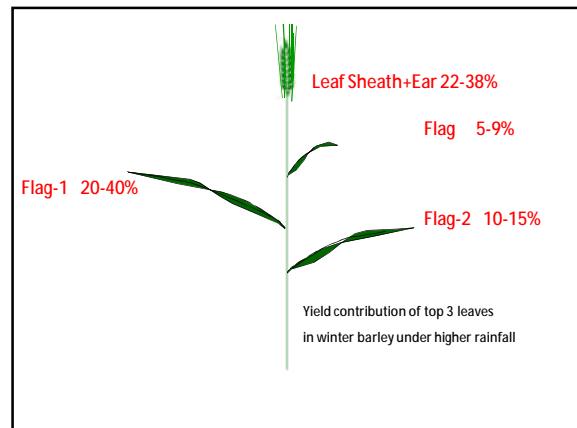
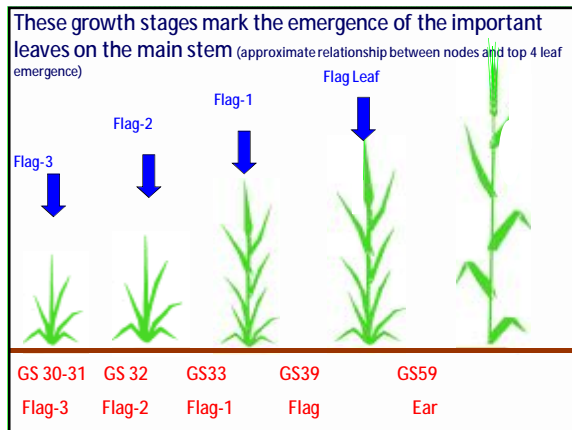


Grazing Crops - Chilwell

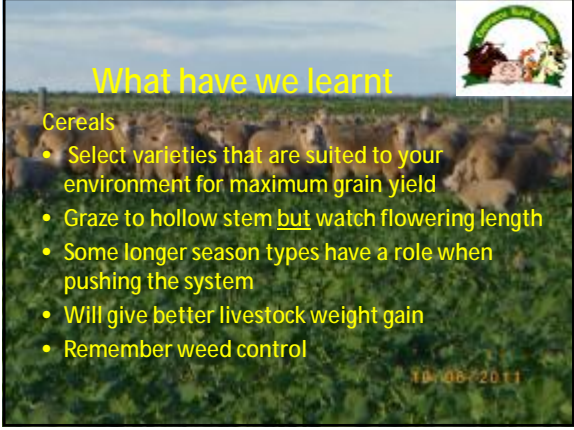
The Future for Grazing Crops

- We are very confident with cereal grazing.
- More research is required on canola grazing in relation to both yield impacts and animal health/performance issues.
- More research is required on extra nitrogen requirements after grazing on all crops.
- More research is required in lower rainfall zones.









What have we learnt

Cereals

- Select varieties that are suited to your environment for maximum grain yield
- Graze to hollow stem but watch flowering length
- Some longer season types have a role when pushing the system
- Will give better livestock weight gain
- Remember weed control

10/06/2011



Canola

- Again select varieties that yield in your environment
- Know your maturity; length of time for flowering is most important with grazing canola
- If you have early moisture, canola has the advantage of more weed management options
- Think about the different canola systems

10/06/2011



Where are we going with Grazing Crops

- Clients that have start grazing crops will keep pushing and refine the system as confidence grows
- Adapting farms to maximise the grazing opportunities
- Cropping producers that still have the infrastructure can increasing livestock number, livestock operation increasing cropped area

10/06/2011



We have proved that you can graze grain crops with minimal to no yield effects.

It is about how you can fit it into an individual operations.

10/06/2011

Grazing Canola and other ideas

Dale Cronin

2008

- In 2008 there was a frost that wiped out our canola.
- To manage the damage we cut it all for hay.
- It then rained and didn't stop raining. The hay went rotten in the windrows.
- Multiple risks experienced and no return on those inputs

2009

We trialled grazing of a number of open pollinated, hybrid, Clearfield and conventional varieties with DAFWA.



35 SAMM lambs/ha for 21 days from 3rd August. Increased body condition by 0.33CS and grew 189kg of liveweight/ha = \$425/ha*

We learned that lambs that grazed canola with their mothers prior to weaning grew 50% quicker than inexperienced lambs.

(* assumes \$50/kg cwt dressing at 45%)

Lesson - Earlier grazing allows better recovery... This was not early!



3 Aug - Pre grazing

24 Aug - Post grazing

- Trial dry sown 19 May. Late germination
- Grazed too late, as some plants were bolting

Lesson - Grazing too late does retard flowering



26 Aug - 2 days post grazing



2 Oct - 39 days post grazing

- Grazing resulted in 2 – 3 times as many stems on plants

Lesson - Grazing too late also affects yield when season cuts off early



29 Oct - 66 days post grazing

Average yield penalty of 51%. 1.66 vs 0.81 t/ha = \$360 loss/ha*.


Grazed a bit late for too long and the potential of the pods on grazed canola was not reached (small seed). However net gain of grazing crop was \$65/ha, ignoring all other benefits.

(* assumes canola returning \$426/t)

2010

We grazed Mallee HT and Bravo TT for 7.5 days from 7th August.

15 Aug




Mallee HT

Bravo TT

The frosts during June and July and dry season resulted in poor plant growth rates and late grazing date.

9 Sep




Mallee HT
125dse/ha
+0.16 CS
Grazing \$130/ha

Bravo TT
50dse/ha
+0.09 CS
Grazing \$76/ha


There may have been some problems with liveweight gain data due to gut fill, so change in body condition score was used instead. However daily live weight gains were about 300g/head/day

Weather stats Wagin 2010 188mm = 59% of Ave GSR 320mm, 44 days $\leq 3^{\circ}\text{C}$.
Less than 25mm fell after grazing concluded

9 Sep



5 Nov



Ungrazed yield 200kg/ha
Single grazed
Grazed off not harvested

	Hand harvest results	Actual harvest results
Mallee	Grazed yield 170kg/ha Ungrazed yield 450kg/ha	Mallee Grazed yield – not harvested Ungrazed yield 200kg/ha
Bravo	Grazed yield 160kg/ha Ungrazed yield 410kg/ha	Bravo Grazed yield – not harvested Ungrazed yield 200kg/ha

After harvesting costs grazed Mallee was \$119 ahead and grazed Bravo was \$1 better – not including other benefits. (valuing 10MJ feed at \$250/t to achieve CS increase)

2011

Growing lambs on canola/clover pasture crop Photos 28th July

Between 15 July and 5th Aug lambs grew at 200g/head/day. Stocking rate of 15 lambs/ha

To grow 25 kg extra live weight will take 50 days. Equivalent of 250kg live/ha. Assuming \$3kg live = \$750/ha



Additional benefits of establishing clover pasture while generating feed to grow and finish lambs, allowing grass weeds to be controlled, and generating nitrogen for next year's wheat crop. Then into a productive clover dominant pasture phase. Low stress, no hassles.

Growing lambs on feeders in confinement



16 MJ/head per day will grow lambs at 200g/day, cost of 40c/head/day (if 2.5c/MJ)

To grow 25 kg extra liveweight will take 125 days and cost \$50/head

Reasons why?

- Originally to have a cheap feed source for prime lamb enterprise.
 - Graza Oats – hybrid and expensive
 - barley – grazing too late and unproductive
- Wedgetail wheat-disease
- Decided to try canola

Why

- Disease break at the end of cereal rotation
- Controlling grass weeds
- More balance fodder needing less supplementary minerals
- Opportunity to keep small amount of seed and sow larger areas compared to cereals.
- Large amount of dry matter and the ability to regenerate

Things we have tried

- Different hybrids TT and IT
- More early vigour
- IT are grazed predominantly in the east, 'easier just to grow varieties you already have, need a high black leg rating.'
- Grazing Brassica "titian" prolific but sucker for BL

This year

- Growing 8 kg of Losa and 8kg of Bravo
- 22nd May after RU and insecticide
- Spray of select and select targa on bad barley grass.
need for early chemical control of grass weeds for clover composition (also for with-holding periods).

Grazing

- Background lambs with ewes 5 days (too long).
- Ewes were vaccinated before lambing came off greenish pasture.
- Remembered eating canola from last year
- Access to canola hay

Grazing

- Lambs weaned didn't look back
- Electric fence "Solar"
- Harder grazing pressure more clover dominance, less grazing days.
- Access to pellets 250g for sale lambs for last 3 weeks.
- Reduced grazing pressure when trying to push lambs for sale. Plants responded by pushing up a stem, less productive.

Problems

- Hard to control Capeweed, fumitory, raddish in crop
- Like to camp in certain areas (electric fence)
- More nitrogen would have increased growth.
- Need to time spraying to control raddish, grasses and not to reduce seed set of losa. (30% hard seeded)
- Need to decide to crop or leave to pasture next year. (clover seed set)

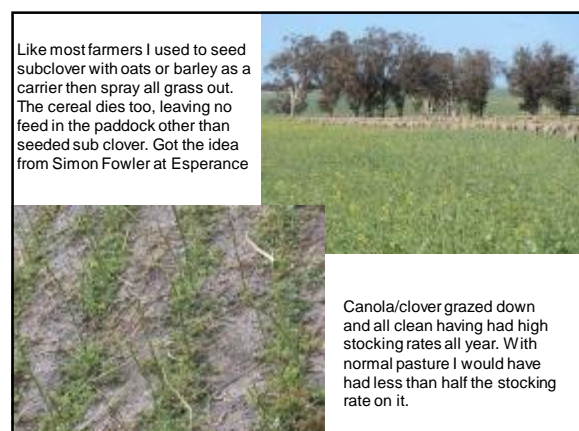
Benefits

- A way to get income while increasing clover composition in pasture
- Lambs seem to do very well
- Pasture in other paddocks is being deferred
- Later in the year opportunity to manipulate paddocks knowing you have extra feed.
- Good opportunity to reduce weed burden of paddock.

Things to try next year

- Rye corn looks impressive at the moment
- Dry seeding canola and clover with Alsoska
- Dry seeding canola into clover dominate pasture.
- Improve practices and measuring for grazing ewes on early sown barley paddocks.

- To increase profits need to have a plan to increase stock numbers or increase cropping area knowing you have the extra fodder.
- Or decide to manipulate other pastures harder and earlier than normal.



Grazing Clover/Canola Combo

- **KEY POINTS**

- wean lambs onto for high healthy growth rates (in dry years its gonna be a saving on grain)
- earlier the start the more canola will seed, may get a yield too
- will stay green into the summer if rain continues
- manipulate the pasture to setup for cropping taking out the competition and disease leaving high FOO

How Grazing Crops Fit At Kolindale

No profit in grassy crops (less rain the more so)

Need all clover pastures (nitrogen fixation)

Clover = no early feed = grazing crops

30-40% ewes scanned in twin

*Twin ewe NEEDS 23-27mj required a day *

\$\$\$*Instead being on ad-lib self feeder

use your clean early crops*\$\$\$

Put all twin ewes on crops to allow clover pastures to get away (More feed in the spring).

Seed an extra paddock of barley if you think there is a yield penalty over your ave of years. To have no yield loss + the graze + the extra stubble after harvest.



INTRODUCTION

- n Terara is a Grain and Graze property at East Binu in the shire of Northampton.
- n Average annual rainfall is usually 320mls
- n 2004 191mls – 191mls growing season
- n 2005 322mls – 190mls growing season
- n 2006 167mls – 98mls growing season
- n 2007 116mls – 107mls growing season
- n 2008 334mls - 284mls growing season
- n 2009 318mls - 277mls growing season
- n 2010 302mls - 204mls growing season
- n 2011 420mls – 345mls growing season (So far)

AIM

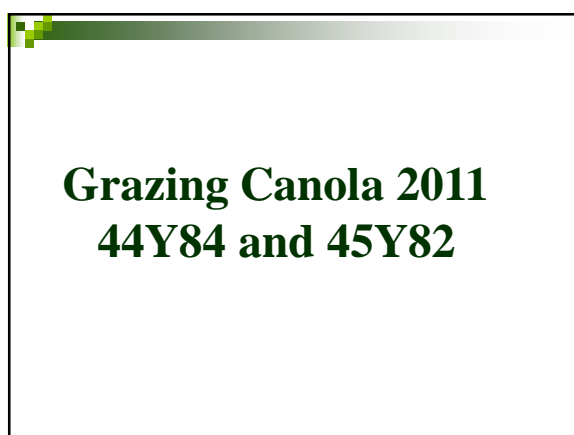
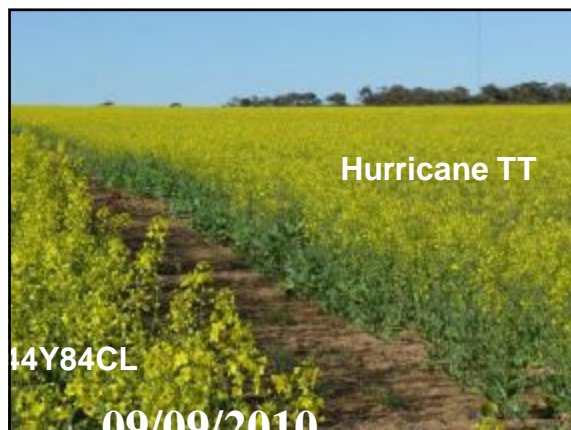
- To develop an effective farming system and manage grazing – water efficient agriculture
- Continue to combine the **GRAIN and GRAZE** programme, (boost the profitability of mixed farms while helping to protect the natural resources), with the **ENRICH** programme (multi-purpose grazing system using perennial shrubs).



Why strip graze cereals?

- q Increase profitability by increasing stocking density.
- q It's easy
- q Cereals outperform regenerative pastures, so feed can be utilized much earlier. Early sown crops can be grazed by the second week in June. 2010, 11th June. 2011, 7th June.
- q Can eliminate hand feeding early winter.
- q Ewes lamb down on consistent, even feed.
- q Flexible, depending on rainfall.
 - q a) graze out
 - q b) graze and harvest
 - q c) multi-graze then leave for standing summer feed or swathe for weaning lambs on to.
 - q d) graze out completely, spray then sow forage brassicas in early August.
- q Sheep can graze weeds out of crops?





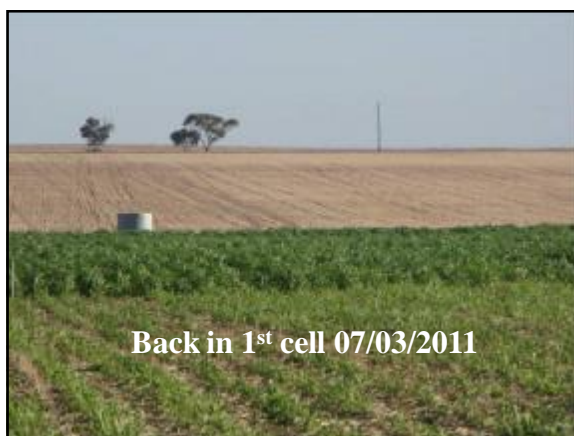




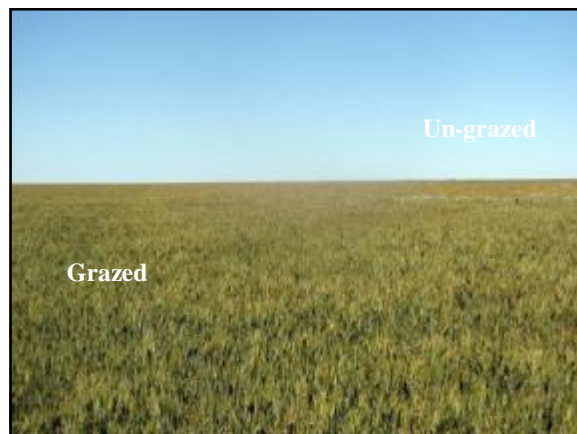
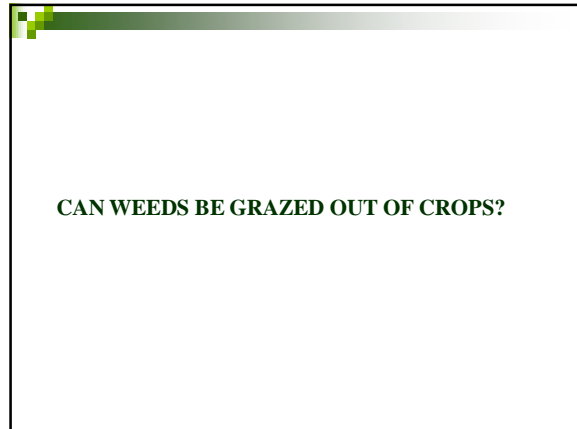
SHEEP PROGRAMME

- q Rams in end of January - due end of June.
- q Crutch first week of May – blowfly control and vaccinate.
- q Onto grazing cells 2nd week of June.
- q Lamb last week in June.
- q Mark and vaccinate lambs last week in August.
- q Shear ewes and wean/drench lambs last week in September.
- q Vaccinate lambs mid October.
- q Shear lambs 1st week in December.

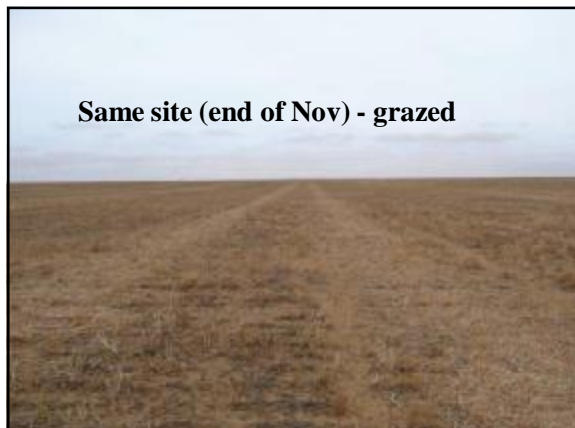
SHEEP GRAZING CYCLE





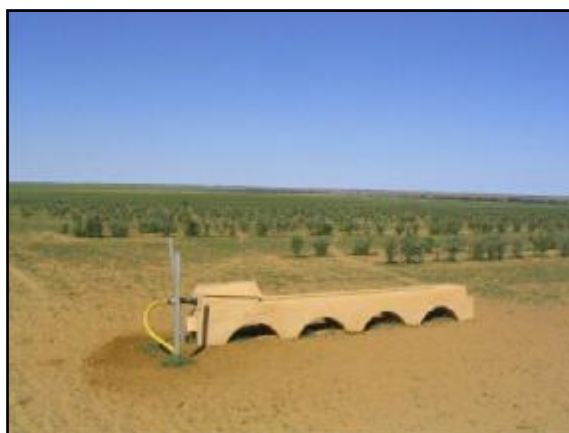


Same site (end of Nov) - grazed



How I strip graze cereals.

- n A RAPPATV electric fencing system to run out wire fences
- n Infrastructure – common water and electric lines, portable troughs etc.



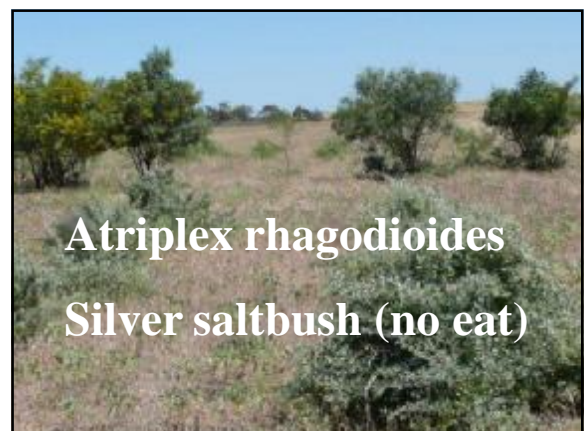


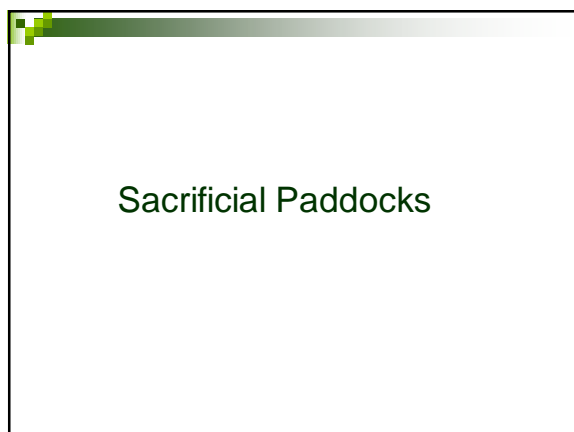
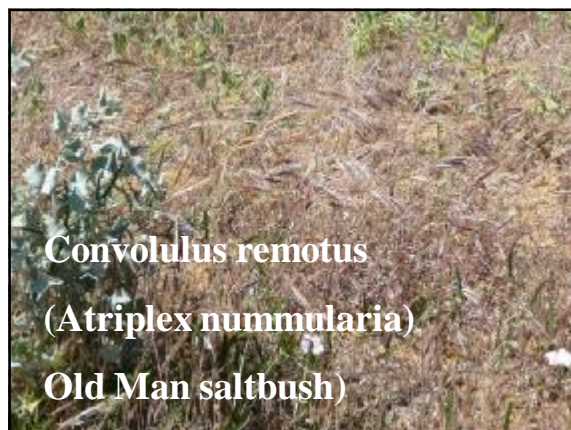
ENRICH – Integrating forage shrubs into the system.

- n Planting forage shrubs on marginal land to make it more profitable.
- n A way forward in dealing with seasonal variation in rainfall. Forage shrubs respond well to out of season rain.
- n Provide livestock with a better environment (shade and shelter).
- n Reduce wind erosion under stocking conditions.
- n Reduces costs and time spent supplementary feeding livestock during the summer – autumn period.
- n A variety of forage shrubs can be utilized by sheep to improve health and production.
- n Helping to DROUGHT PROOF the farm.



FODDER SHRUBS





Grain and Graze-Muelsing?



Still to be investigated

- Wheat varieties that are suited to grazing in local area. Need hybrid type wheats with better seedling vigour.
- Can grazing cereals contribute to weed control? If so can we develop a system for that?
- Grazing crops and leaf diseases.
- Grain and Graze Programme – Grazing crops can contribute to better livestock management. I consider that grazing crops has enabled me to cease muelsing on my farm.

2011 Project

- Dry sow forage Dictator barley.
- Multi-graze hard – 4 grazes from 11/06/2011 to 03/08/2011.
- Sprayed out completely, then reseeded with forage brassicas. This year used Pulsar forage rape and Pacer leafy turnip. Hoping it will reach grazing stage in 42 days (mid October).

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Grazing crops

Mark Seymour and Matt Ryan
DAFWA, Esperance



Department of Agriculture and Food

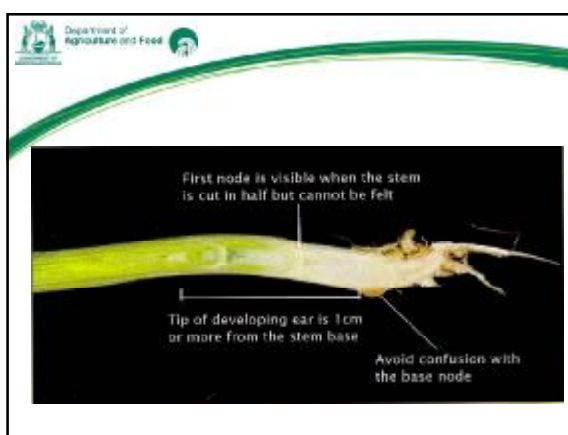
Grazing Trial

Sown April 15 or May 18

- \$ Conventional and Clearfield
 - \$ 44Y84 CL, CB Agamax, Av Garnet, 46Y83 CL, CBI 406, CBI 306, CB Taurus, CBW 208
- \$ Roundup Ready
 - \$ Hyola 404RR, GT Scorpion, Hyola 505RR, 45Y21 RR, 45Y22 RR, GT Mustang, 46Y20, 46Y20 LD
- \$ Wheat
 - \$ Westonia, Endure, Yitpi, Wyalkatchem, Magenta, Mace, Scout, Wedgetail
- \$ Barley
 - \$ Fleet, Hindmarsh, Buloke, Baudin, Vlammingh, Oxford, Gairdner, Uramble

Grazing

- 1st June simulated grazing
- 16th June cattle begin grazing
- 4th July grazed canola area split in two
- 14th July grazing ceases

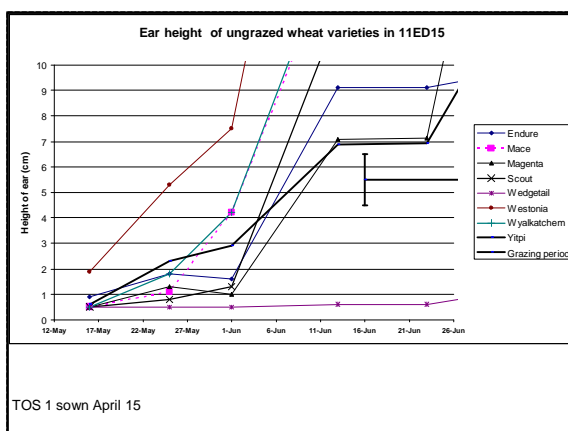


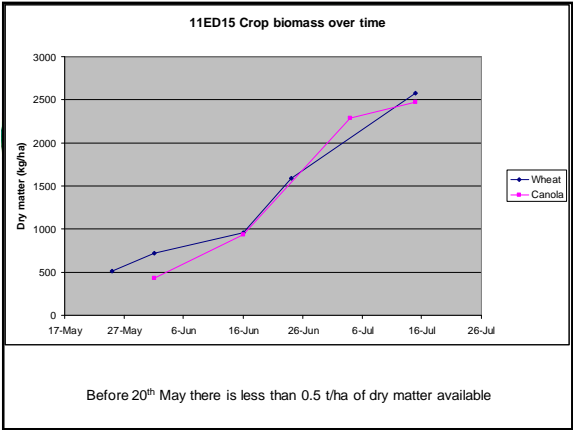
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Weeks after sowing when ear at 1cm reached

Species	Variety	April 15	May 18
Barley	Baudin	5	10
	Buloke	5	8
	Fleet	4	9
	Gairdner	7	9
	Hindmarsh	4	8
	Oxford	6	9
	Uramble	7	10
Wheat	Vlammingh	6	9
	Endure	5	9
	Mace	6	9
	Magenta	5	9
	Scout	6	9
	Wedgetail	11	10
	Westonia	4	8
Wyalkatchem	5	9	
Yitpi	5	9	

Dividend 6 weeks, Zorro 9 weeks, Jockey 6 weeks, Impact 4 weeks

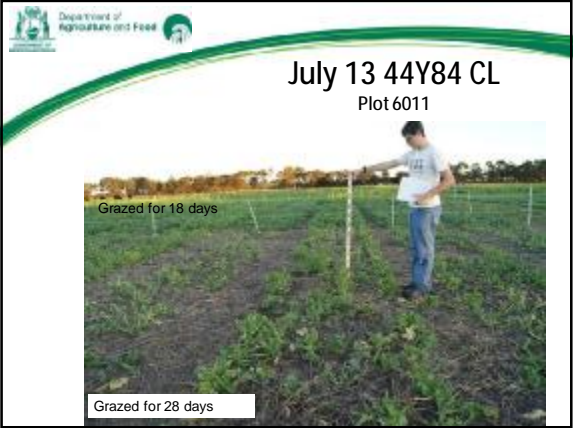


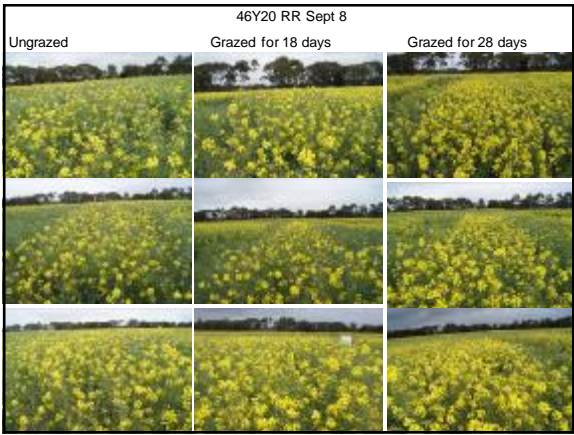
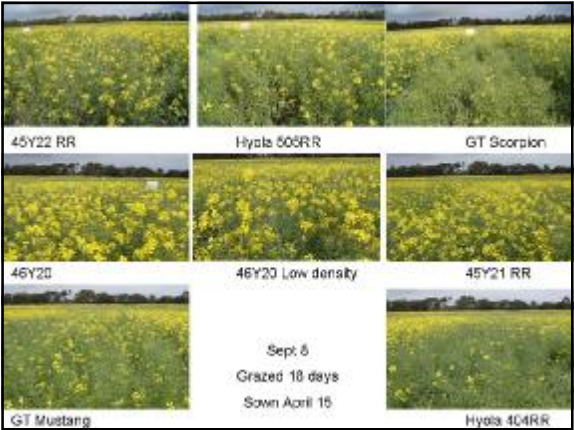
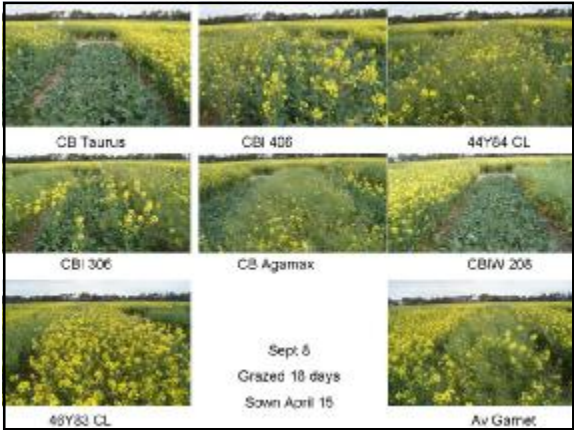


Phenology of canola on 15th July – close to when cattle removed

Herb	Variety	Un-grazed	2 weeks	4 weeks
WT	44Y84 CL	Bud viable to flowering	Bud enclosed	Bud viable
	46Y83 CL	Bud viable to flowering	Bud enclosed to above canopy	Bud enclosed to bud viable
	Av Garnet	Bud viable to flowering	Bud viable to above canopy, some eaten	Bud viable, some eaten
	CB Agamex	Bud viable to flowering	Bud viable to at canopy	Bud viable, some eaten
	CB Thomas	Rowette to bud enclosed	Rowette to bud enclosed	Rowette to bud enclosed
	CB 306	Rowette to bud enclosed	Bud enclosed	Rowette to bud enclosed
	CB408	Bud enclosed to bud viable	Bud enclosed	Rowette to bud enclosed
	CBW 204	Rowette to bud enclosed	Rowette to bud enclosed	Rowette to bud enclosed
RR	45Y21 RR	Bud viable to above canopy	Bud enclosed	Bud enclosed to bud viable
	45Y22 RR	Bud enclosed to flowering	Bud enclosed to above canopy	Bud enclosed to bud viable
	45Y20	Bud viable	Bud enclosed to bud viable	Bud enclosed to bud viable
	45Y25 low density	Bud enclosed to above canopy	Bud enclosed	Bud enclosed to bud viable
	GT Muckang	Bud enclosed	Bud enclosed	Rowette to bud enclosed
	GT Scorpion	Mostly flowering, some at canopy	At canopy to flowering	Bud enclosed to bud viable
	Hydra 404 RR	Above canopy to flowering	Bud enclosed to flowering, variable	Bud viable
	Hydra 505 RR	At canopy to flowering	At canopy to above canopy, odd one flowering	Bud viable







Other mid late lines available (have a CAA 2011 rating) which are suited to April 15 sowing and grazing

Variety	Herbicide type	Open or Hybrid	CAA 2011 bare
46Y83 CL	CL	Hybrid	MR (R)
Hyola 76	Conventional	Hybrid	R
Hyola 606RR	RR	Hybrid	R-MR
Hyola 601RR	RR	Hybrid	R
46Y20 RR	RR	Hybrid	MR (R)
Hyola 751 TT	TT	Hybrid	MR
Monola 76 TT	TT	Open	MR-MS (R)
ATR-Martin	TT	Open	MR-MS (R)

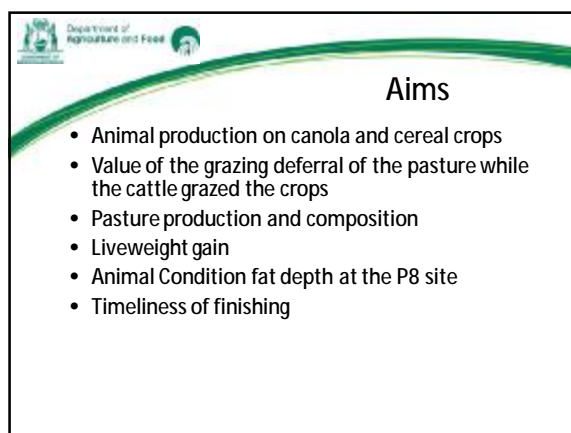
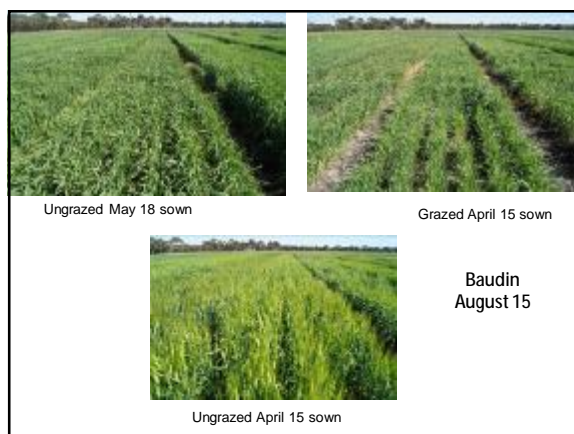
And GT Mustang which is called a Mid



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15th July, one day after stock removed
11ED15 cereal Plot 1020

Gairdner Baudin Oxford



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Methods

- 12-14 month old Angus heifers
- Average Weight 340 kg
- 27 heifers grazing a 24 ha pasture paddock
- Split mob into 3 groups of nine
 - Nine went on the cereal
 - Nine went on the canola
 - Nine returned the pasture in 3 replicates
- Replicated on return to pasture
- Not replicated on the crops because of the complex design



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Methods cont

- Started grazing the crops on the 16 June
- Prior to grazing the crops the animals were fed on hay in the yards
- Access to hay
 - 30% of their intake for the month
 - Literature recommends no more than 70% brassica as low in fibre
- Access to Mineral lick block Econvite®
- Wheat has low Na and high K which reduces Mg uptake and can lead to grass tetany

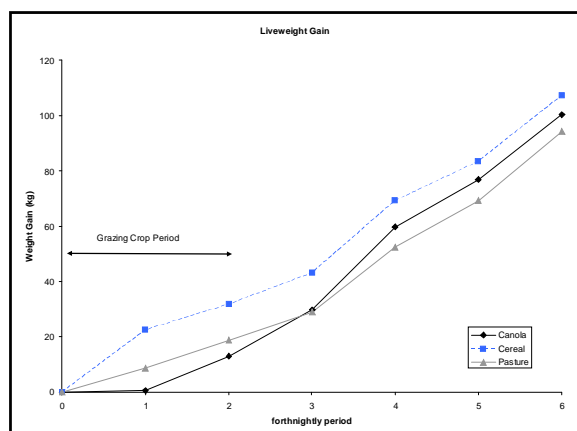
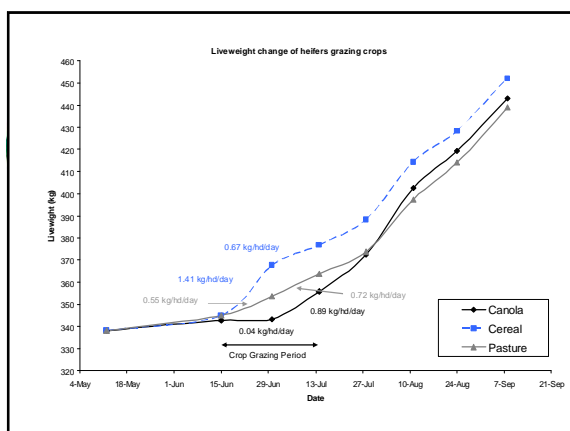
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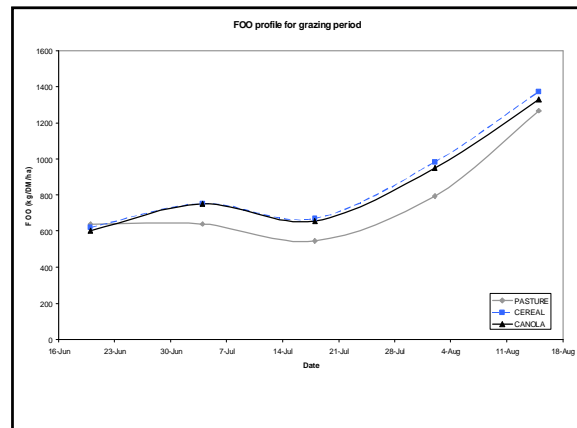
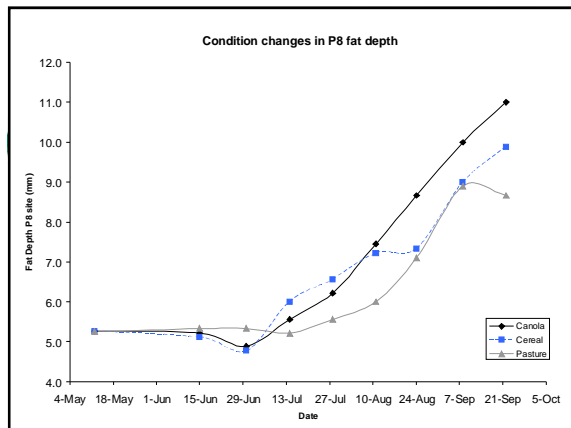
Methods cont

- Animal behaviour on canola
 - Walked the boundary looking for non canola feed
 - Flighty agitated
- Reduction in area
- Stocking rates

From	To	Area	Animals/ha	DSE/ha
16-Jun	24-Jun	5.8	1.5	12
24-Jun	30-Jun	3.1	2.9	23
30-Jun	7-Jul	2.4	3.8	30
7-Jul	11-Jul	3.1	2.9	23
11-Jul	14-Jul	2.4	3.8	30
Average			3	22

From	To	Area	Animals/ha	DSE/ha
16-Jun	24-Jun	5.8	1.5	12
24-Jun	4-Jul	4.0	2.3	18
4-Jul	11-Jul	2.1	4.4	35
11-Jul	14-Jul	4.0	2.3	18
Average			2.6	20





Animals & pasture

- Weight gained
 - Canola 13 kg
 - Cereals 32 kg
 - Pasture 19 kg
- Pasture deferment
 - 150 kg dry matter difference
 - Currently Less than 100 kg DM
 - 32mm of rain during deferment period
 - Cold
 - Loss of clover (red leaf ???)

Potential health issues

- Canola
- Nitrate toxicity
 - When protein production can not keep up with nitrogen uptake in plants the excess accumulates as nitrates. Excessive nitrates in plant tissues when grazed by ruminants convert to nitrites in the rumen. Nitrites accumulate in the blood stream and bind to haemoglobin and it can no longer carry oxygen
 - Animals suffer oxygen deprivation
 - Sudden death, salivation, rapid breathing
 - When conditions promote plant growth but limit photosynthesis
 - Sudden changes in temp, rain following dry period, frosts, overcast days, excessive nitrogen fertiliser, soils deficient in sulphur, phosphorus molybdenum, or high acidity levels

Potential health issues

- SMCO - S-methyl cysteine sulfoxide
 - non protein amino acid
- Damages red blood cell membranes
 - leaking haemoglobin which ends up in urine
- Moderate levels cause anaemia, reduced appetite, ill thrift
- Severe levels can cause sudden death
- Caused by
 - Animals grazing Brassica's that have bolted or flowering in spring
 - Soils with high sulphur levels or high sulphur fertiliser use

Potential health issues

- Iodine deficiency (goitre)
 - Brassica low in iodine and produce glucosinolates which inhibit iodine uptake
 - Iodine is important for growth.
 - Particularly cell differentiation
 - Inclusion in thyroid hormones
 - Greatest effect is on the developing foetus in late stages of pregnancy




Key Messages

- Less of a growth check on cereals compared to canola
 - particularly importance in growing stock
- Clip grazing phase was more productive for growing stock
- There is an obvious adaptation period
 - approx 2 weeks for cattle grazing canola
 - Possible solutions - Pre adaptation or use breeding stock
- We did not observe any health issues however there are a number of possible problems when grazing brassicas
 - Nitrate poisoning
 - Goitre (iodine deficiency)
 - S methyl cysteine sulphoxide (SMCO) damages red blood cell membrane causing haemoglobin leakage from cells



What we have learnt

- Managing WHP's is difficult
- Need to get more than 2 weeks grazing on canola
 - or view them as holding paddocks
- April sown spring cereals is problematic
- Pushing animals hard increases amount of stem eaten which may reduce potential growth rates
- Clipping crops seems less risky at a wider range of development stages and may give best animal performance – provided stock are mobile
- Need to manage the pasture when the animals are on the crops so they can return to a good plane of nutrition




Future activities

- Need to adapt the system so it suits WA
 - Bringing the activity into the mainstream
 - Grazing May sown crops – when to stop
 - Clip vs. Crash grazing
 - Height x time of grazing x frequency/length trials
 - Maximising animal performance whilst on crops and when they go back to pasture
 - Extending time on crops – in particular canola
 - Improving pasture deferment
 - Clip vs. Crash grazing
 - Crop development database
 - Update Flower models to included Z30?
 - Need a slightly longer wheat variety (9 weeks to ear at 1 cm from April sowing)
 - Better system for April sowing/Seedling vigour for April sowing



What we have learnt - details

- Managing WHP's is difficult
 - Need to use bare seed
 - Timing of post-em herbicides is problematic
- Need to get more than 2 weeks grazing on canola (or view them as holding paddocks)
 - 40/20 RR (Mid-Late) seems right maturity for April 15 sowing
 - Or plan canola paddocks so they are ready at different times and animals can move from one to the other – the cost of delayed sowing may sometimes outweigh animal benefits
 - Longer season canola lines are safe to graze for longer but unlikely to yield well in WA
- April sown spring cereals is problematic
 - Development rushes
 - Ready at relatively low biomass in mid May and prior to the end of many seed dressing WHP's
 - Wedgetail wheat and Uramba/Gardiner barley development suits April sowing in WA
 - Viamingh seems to be recovering ok
- Pushing animals hard increases amount of stem eaten which may reduce potential growth rates
- Clipping crops seems less risky at a wider range of development stages and may give best animal performance – provided stock are mobile
 - Does not necessarily need April sowing to make it work
 - Large areas grazed a little
- Need to manage the pasture when the animals are on the crops so they can return to a good plane of nutrition



Future activities - details

- Need to adapt the system so it suits WA
 - Bringing the activity into the mainstream
 - Grazing May sown crops – when to stop
 - Clip vs. Crash grazing
 - Height x time of grazing x frequency/length trials
 - Maximising animal performance whilst on crops and when they go back to pasture
 - Extending time on crops – in particular canola
 - Improving pasture deferment
 - Clip vs. Crash grazing
 - Crop development database and model (update Flower models to included Z30?)
 - Need a slightly longer wheat variety (9 weeks to ear at 1 cm from April sowing)
 - Better system for April sowing/Seedling vigour for April sowing
- Current DAFWA work funded by CSIRO (ex GRDC \$) – ends 2011
- Funding opportunities exist
 - via National GRDC review/project and MLA
 - Sorted out over next 3-6 months?

Barley agronomy for the western region (DAW00190)

Department of Agriculture and Food
ANDREA HILLS
Barley Research Officer




How does grazing affect disease management?

Andrea Hills, Barley Research Officer, DAFWA - Esperance




How does grazing affect disease management?

- A trial at Gibson (high rainfall, AgZone 6) is in progress
- Treatments:
 - Baudin barley x 2 seed dressings x \pm grazing x 4 foliar fungicide regimes
 - Grazing done by 'Victor' (the lawnmower) weekly



How does grazing affect disease management?

- 2011 – powdery mildew was resistant to seed dressings used in the trial

➡ Can not directly assess if a seed dressing is still required if grazing as the registered seed treatment was ineffective


However:

- Jockey effective past Z31 (stem elongation) in a pathology trial nearby

➡ The seed dressing controlled leaf diseases for longer than grazing.

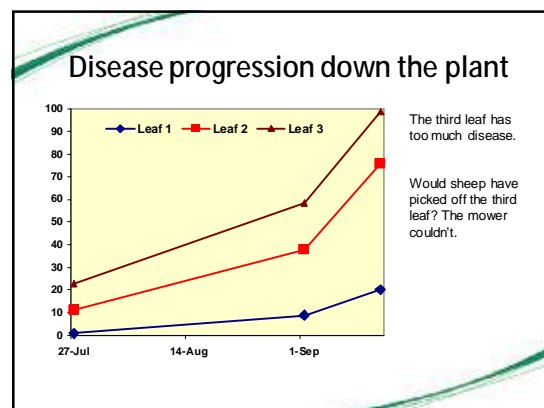
The WHP for Jockey is 6 weeks, so using it means you miss out on a week or two of early grazing

Baudin at Gibson, 2011
78 days after sowing (yellowing of leaves due to powdery mildew) – picture taken on 11 August



Untreated Experimental seed dressing fungicide Impact In-furrow @ 400 mL/ha Jockey @ 300 mL/100kg seed

11ED032



Grazing reduces disease levels

- A week after grazing finished (27 July), the top leaf had less than 1% disease on it while the ungrazed was 20% diseased.
- Average for grazed was 12% and 53% for ungrazed (top 3 leaves).

Plots (July 21)



Grazed (July 21)



1% (July 27th)

Ungrazed (July 21)

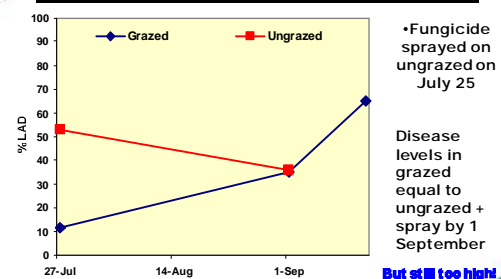


20% (July 27th)

Post grazing disease levels

- After grazing finished on July 25th, powdery mildew levels increased and needed to be controlled by fungicide

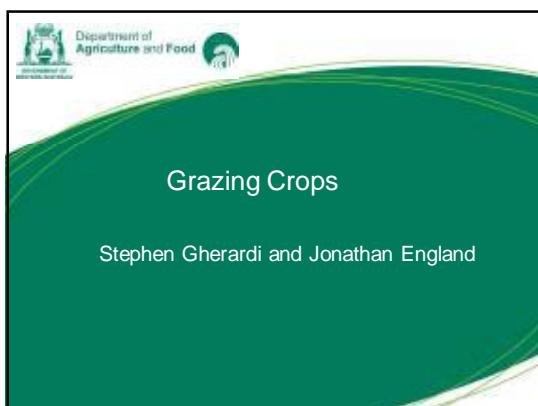
Ungrazed + 1 fungicide vs grazed (unsprayed)



Conclusions

- Grazing will decrease disease levels on the top leaves.
- If lower leaves are not grazed they will still become severely infected.
- After grazing, under high disease pressure, grazed barley needed spraying to control powdery mildew – but it was significantly better than using a dud seed dressing and leaving the barley ungrazed.
- 2011 was an extremely high pressure season for powdery mildew (a three spray season, not two!)

Thank you



Objectives

- § Measure the production from sheep (condition score, liveweight and grazing days/ha) grazing a standing cereal or canola crop
- § Compare the yield and quality of grazed crops with ungrazed crops
- § Undertake a gross margin analysis to calculate the potential benefits of grazing crops

Seasonal constraints and FOO requirements

- § Season broke late with very little follow up rain – delayed sowing
- § Plant growth exceptionally slow due to lack of rain and frost
- § Unable to graze until FOO 700 kg DM/ha
- § Therefore grazing delayed to late July-August
- § Approval to have this limit lowered to 400 kg DM/ha
- § Crop recovery impeded due to very dry conditions post-grazing

Kane Page – Pingelly (400-450 mm)



Dash Barley Sown: 26 May (17 ha)
Grazed 27 July to 3 August (7 days)
Merino ewes and PD lambs @ 69 DSE/ha
Ewes gained 0.1 CS

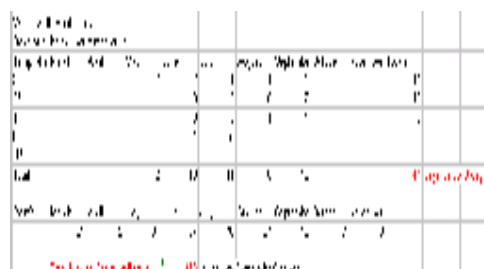


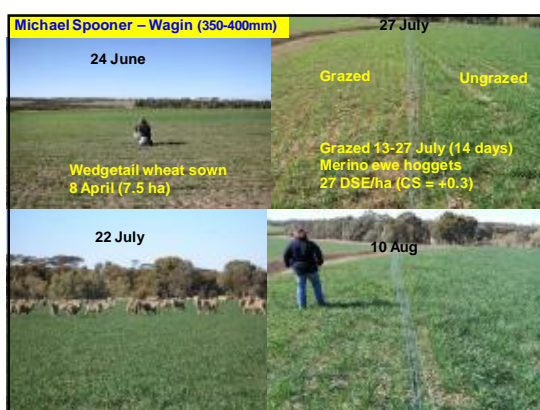
Wyalkatchem wheat sown 29 May (27 ha)
Grazed 3 - 10 August (7 days)
Merino ewes and PD lambs @ 43 DSE/ha
Ewes gained 0.2 CS

Page - Pingelly Grain yields (t/ha)

	Ungrazed	Grazed	Difference
Dash Barley	1.68	1.21	0.47
Wyalkatchem	2.23	1.73	0.5

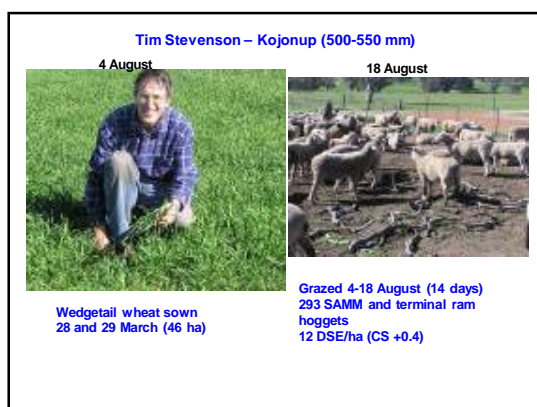
No rain = frosts = no crop





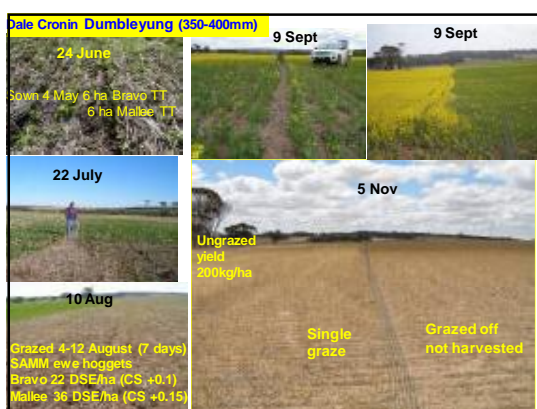
Spooner - Dumbleyung Grain yields (t/ha)

	Ungrazed	Grazed	Difference
Wedgetail	0.79	0.72	0.07



Stevenson – Kojonup Grain yields (t/ha)

	Ungrazed	Grazed	Difference
Wedgetail	2.5	2.7	- 0.2



Benefit of grazing in 2010

District	Crop	DSE Grazing days/ha	Value Grazing (CS) (\$/ha)	Grazed Crop (yield x price) (\$/ha)	Grazing + Crop (\$/ha)	Ungrazed Crop (yield x price) (\$/ha)	Benefit of Grazing (\$/ha)
Pingelly	Dash Barley	775	160	234	394	325	69
Pingelly	Wyalkatchem	1322	274	466	772	642	130
Wagin	Wedgetail	1398	290	202	493	222	270
Kojonup	Wedgetail	477	99	771	870	714	156
Dumbleyung	Bravo TT	370	77	0	77	76	1
Dumbleyung	Mallee HT	941	195	0	195	76	119

Value of grazing in 2010

District	Crop	Value Grazing (CS) (\$/ha)	Value Grazing (\$50/DSE) (\$/ha)	Difference			
Pingelly	Dash Barley	160	106	54			
Pingelly	Wyalkatchem	274	181	93			
Wagin	Wedgetail	290	191	99			
Kojonup	Wedgetail	99	65	34			
Dumbleyung	Bravo TT	77	50	27			
Dumbleyung	Mallee HT	195	128	67			

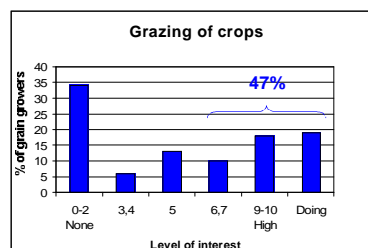
Benefit of grazing in 2010

District	Crop	Value Grazing (CS) (\$/ha)	Value Grazing (\$50/DSE) (\$/ha)		Benefit Using CS (\$/ha)	Benefit Using DSE \$50/ha (\$/ha)
Pingelly	Dash Barley	160	106		69	15
Pingelly	Wyalkatchem	274	181		130	37
Wagin	Wedgetail	290	191		270	171
Kojonup	Wedgetail	99	65		156	122
Dumbleyung	Bravo TT	77	50		1	-26
Dumbleyung	Mallee HT	195	128		119	52

Grazing crops can also.....

- § Delay flowering - double edged sword
Frost risk vs short season
- § Reduce biomass and open up canopy (WUE and disease)
- § Save on supplementary feed
- § Add condition to key stock (ie pregnant ewes, lambs etc.)
- § Increase stocking rate
- § Provide an edible shelter for lambing ewes
- § Allow deferment of pastures
- § Reduce risk

Survey of largest 50% grain producers (by production) (n=300)



Conclusions

- § Benefit from grazing crops even in one of the driest seasons on record
- § Maximise benefit by rotationally grazing a series of crops over at least a 3 to 4 week period
- § Start to graze early to minimise the chance of a loss of crop yield
- § Target the class of animals from which achieve the greatest return

Where to from here?

- § Grazing crop strategies for different regions?
- § Are there particular varieties of crops we should not be grazing?
- § Can we define windows for the grazing of particular crops/varieties?
- § How variable is the production response of sheep on particular crops and when they move from crop to crop and crop to pasture?
- § How do we best service the requirements of those wishing to learn more about the grazing of crops?



2011

Grazing Crops

8 paired paddock demo's

- 3 x Geraldton area (Richard Quinlan)
- 2 x Kojonup area (Sam Taylor)
- 3 x Esperance area (Greg Warren)

1 whole farm economic analysis (FSAS)

Binnu – Don Nairn

- Variety: IT Canola 45Y82
- Sown: May 1
- Grazed: June 9-22 ewes @ 36 DSE/ha
- Result: 509 DSE grazing days/ha
- Field Day: August 17 NAG

Ungrazed vs Grazed: July 18



Binnu – Don Nairn

- Variety: Carnamah Wheat
- Sown: May 17
- Grazed: early July @ 24 DSE/ha ewes + lambs
- Result: 267 DSE grazing days/ha
- Field Day: August 17 NAG

Andrew Gillam - Mingenew

- Variety: Wyalkatchem Wheat
- Sown: May 21
- Grazed: July 10-22 @ 17 DSE/ha ewes + lambs
- Result: 218 DSE grazing days/ha
- Field Walk: June 30 MIG

David Robinson – Arthur River



Variety: Currawong Wheat
Sown: April 25
Grazed: June (21 days @ 80 DSE)
July (21 days @ 50 DSE)
Result: 2730 DSE grazing days/ha

Mike Cameron – Kojonup



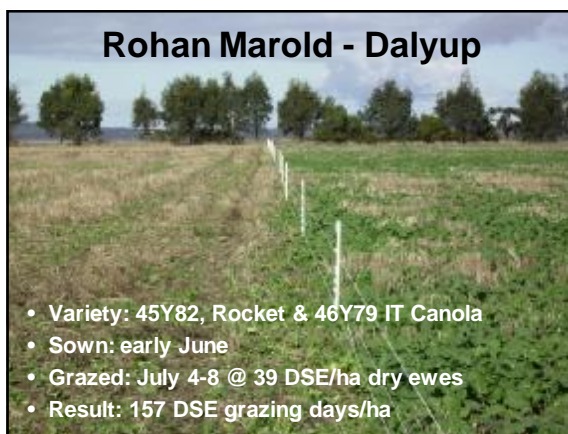
- Variety: Jardee Hybrid TT Canola
- Sown: May
- Grazed: July 4-6 @ 50 DSE/ha pregnant ewes
- Result: 150 DSE grazing days/ha
- Field Walks: July 1 & 29 Southern DIRT

Scott Welke - Cascades



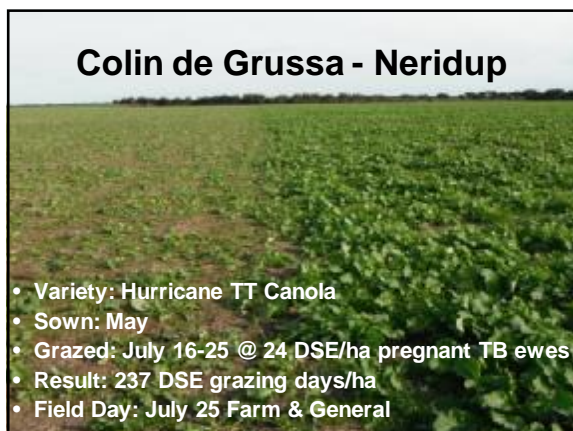
- Variety: Hindmarsh Barley
- Sown: early June
- Grazed: July 17-20 @ 42 DSE/ha ewes + lambs
- Result: 125 DSE grazing days/ha

Rohan Marold - Dalyup



- Variety: 45Y82, Rocket & 46Y79 IT Canola
- Sown: early June
- Grazed: July 4-8 @ 39 DSE/ha dry ewes
- Result: 157 DSE grazing days/ha

Colin de Grussa - Neridup



- Variety: Hurricane TT Canola
- Sown: May
- Grazed: July 16-25 @ 24 DSE/ha pregnant TB ewes
- Result: 237 DSE grazing days/ha
- Field Day: July 25 Farm & General

Economic Analysis

- Work to be conducted by Andrew Bathgate and John Young
- Analysis to focus on Great Southern and Central Wheatbelt to examine contrasting systems (perhaps should be South East Coast for greater contrast...?)
- Analysis to examine macro factors first (year 1) and then examine micro factors (years 2 & 3).



2010

Don Nairn - Binnu



Don Nairn - Binnu

Canola	Ungrazed Income	Grazed Income	Variation	Costs	Grazing Value	Ungrazed Profit	Grazed Profit
45Y82 ITH	155	329	174	316	84	-160	97
571CLIT	297	217	-80	316	84	-19	-15
44Y84 ITH	217	200	-17	316	84	-98	-32
Hurricane TT	121	78	-43	245	84	-124	-83
Average	198	206	8	298	84	-100	-8

Andrew Gillam - Mingenew



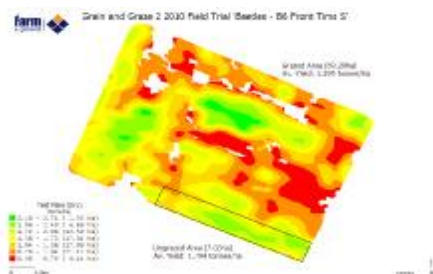
Andrew Gillam - Mingenew



Andrew Gillam - Mingenew

Wheat	Ungrazed Income	Grazed Income	Variation	Costs	Grazing Value	Ungrazed Profit	Grazed Profit	Variation
Bonnie Rock	\$846	\$755	-\$91	\$162	\$61	\$684	\$654	-\$30

Cascades Trial Results – Harvest Yield



Gross Margin Summary

No costs included

Trial Location	Ungrazed Income \$/ha	Grazed Income \$/ha			
		Grain Value \$/ha	Grazing Value \$/ha	Total Grain & Grazing Value \$/ha	Grazed compared with Ungrazed \$/ha
Cascades	\$449	\$324	\$62	\$386	-\$63
Dalyup	\$522	\$500	\$33	\$534	\$11
Mt Howick	\$787	\$749	\$25	\$775	-\$13



Relative Advantages

Livestock

	Advantage	Disadvantage
Livestock Feed	High quality feed at a critical time	
Pasture Growth	Pastures get spelled while crops are grazed	
Animal Weight Gain	High live weight gains from the quality feed	Na:Ca:Mg supplement often needed
Stocking Rate	Potential to increase winter grazed DSE/ha	Temporary fencing Small window of feed Reliability of feed
Supp Feeding	Reduction in supp feeding during winter	
Animal Health	Reduction in worm exposure	Mortalities may increase (e.g. Pulpy Kidney)



Crop

	Advantage	Disadvantage
Grain Yield	Can increase under some conditions	Late grazing will reduce yields
Grain Quality	Variable results. Can reduce screenings.	Protein can decrease
Weeds	Assists broadleaf weed control	Grazing favours annual grasses
Crop Maturity	Delay in maturity can reduce frost risk	Can increase risk of late moisture stress
Disease	Can reduce leaf disease risk	WSMV
Fertiliser		May require more N
Stubble	Better trash flow	Less summer feed and ground cover
Hay / Silage		Grazing will reduce yields.



Whole farm

	Advantage	Disadvantage
Soils		Grazing may cause soil compaction on wet soils
Management	Opportunity to better manage pastures with a short rest in winter	Shifting lambing ewes while grazing crops Larger mob size needed
Fencing		Will need smaller paddocks and/or temporary fencing
Crop:Livestock	Opportunity to increase crop area or stock numbers	
Economics	Profit decreases if yield losses outweigh extra grazing value	Profit increases if extra grazing value outweighs any yield losses



Top 10 Tips for Grazing Crops

1. All cereal and canola varieties can be grazed
2. Sow as early as possible to maximise feed supply
3. Choose clean paddocks esp. for ryegrass
4. Select the right variety for the sowing date
5. Graze early (pinch & twist) and evenly
6. Don't graze too late (before GS 30 and mid-late July)
7. Use a Ca:Na:Mg supplement
8. Adhere to WHP's for pesticides
9. Apply top-up Nitrogen after grazing, not before
10. Start with dry sheep if you lamb in winter...



Next 10 Tips for Grazing Crops

1. Oats > Barley > Wheat for early vigour = more feed
2. Hybrid > TT canola for early vigour = more feed
3. Cereals provide quicker feed than canola
4. Higher sowing rates = more feed
5. Don't introduce hungry or stressed stock to lush crops
6. Big paddocks need subdividing with temporary fencing
7. Small mobs might need boxing together
8. Vaccinate stock for pulpy kidney etc
9. If ryegrass is an issue, graze quickly and only lightly
10. Late grazing delays flowering more than early grazing





Modelling dual-purpose cropping in the low-medium rainfall parts of the CLZ



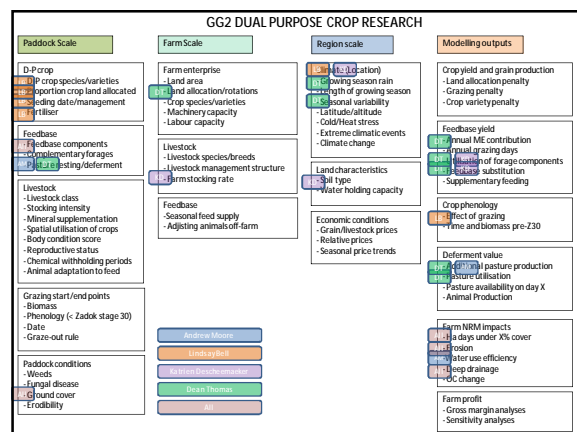
Grain and Graze 2 (GRDC) integration group



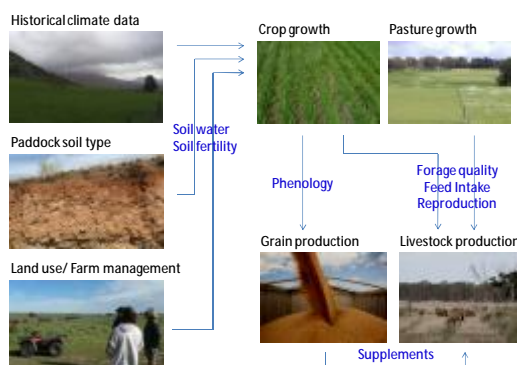
Integration group objectives

Use simulation modelling and related tools to analyse key management practices to identify production-NRM-risk tradeoffs and synergies for integrated crop and livestock enterprises:

- Management options and decision rules for grazing dual-purpose cereals in the lower-rainfall parts of the cereal-livestock zone
- Management strategies for timing the grazing of different elements of the feedbase on mixed farms
- Business and NRM risks & opportunities associated with pasture-cropping
- Water use efficiency effects of managing the crop-pasture transition
- Interact closely with the regional project teams in Grain and Graze and also with other RD&E initiatives, including GRDC's Water Use Efficiency program



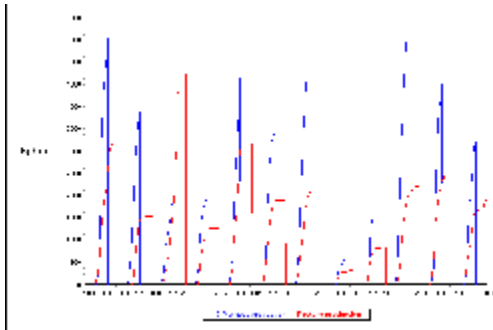
Mixed-farm simulation model



WA Base model summary

- 3000 ha farm (2400 ha rotationally cropped, 600 ha grazing-only)
- Mixed self-replacing Merino and wheat producing farm, early July lambing
- 12 paddocks: 8 rotational wheat and pasture paddocks, 2 permanent pasture and 2 feedlots
- Soil types: Fertile sand (rotations), less fertile sand (permanent pastures)
- Crop: Spring wheat cv. Wyalcatchem
- D-P wheat grazing: Grazed to avoid a yield penalty (soon after establishment and prior to stem elongation)
- Source of feed before annual pastures have useful biomass

Example: 1999-2011 estimated crop and pasture growth at East Binnu



Land allocation, rotations, management

Land allocation

- Crop/pasture rotation (4 x 400 ha and 4 x 200 ha paddocks). The same soil type (fertile sand) was used for all paddocks.
- Permanent pasture (2 x 300 ha paddocks). A less fertile sand was used for these paddocks.
- Feedlot (2 x 5 ha paddocks). Used for holding and feeding animals when insufficient standing forage is available.

Rotations

- The 4 x 400 ha paddocks in a pasture, wheat, wheat, wheat rotation
- The 4 x 200 ha paddocks in a pasture, dpwheat, dpwheat, dpwheat rotation

Sowing rules

- Wheat is sown after 25 April, when there has been cumulative rainfall > 10 mm over 5 days.

Feedbase management

General

- The suitability of feedbase components for grazing is re-evaluated weekly, and animals are moved to a new paddock if required.
- Adult ewes must maintain condition score > 1.7 at all times

Dual purpose crop grazing

- Third priority feedbase component (after crop stubbles and annual pasture)
- Grazed only by adult ewes, although they may have lambs at foot
- The dp-wheat crops can be grazed when they reach 150 kg/ha biomass
- The dp-wheat can be grazed until zadok stage 30
- Each dp-wheat paddock can only be grazed for a maximum of 2 weeks. This is kept relatively low, because of the high grazing pressure used in the model and because the ewes are managed in a single flock and need to be rotated among the 3 d-p crop paddocks available.

Pasture grazing

- Second priority feedbase component
- The minimum animal-available 'green' dry matter for ewes grazing growing pastures is set at either 500 kg/ha or 1000 kg/ha, depending on deferment rule

Crop stubble grazing

- Crops stubbles are given highest priority for grazing, sheep are moved to crop stubbles immediately after the first crop is harvested.
- Crop stubbles can be grazed while the spilled grain > 40 kg/ha (spilled grain from a wheat crop yielding 3 tonnes/ha is 120 kg/ha)
- Each crop stubble can be grazed for a maximum of 35 days or until ground cover falls below 65%
- Ewes can lose a maximum of 2.5 kg after being allocated to graze crop stubbles, before they are moved to a different feedbase component

Permanent perennial pasture grazing

- Fourth priority feedbase component
- The minimum animal-available dry matter for ewes grazing permanent pastures is 800 kg/ha
- Perennial pastures are only available for grazing only from 1 January to 1 May each year (targeting the autumn feed gap)

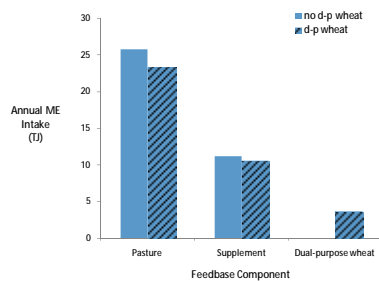
Feedlotting

- Ewes and lambs are moved to a feedlot, and fed wheat and lupins (80:20) when farm standing forage options are not able to provide adequate feed.
- Ewes moved to feedlot are offered 1.5 kg DM/hd/day if their condition score < 2, otherwise they are offered 0.8 kg DM/hd/day of the supplementary feed.
- Lambs moved to feedlot are offered 1.5 kg DM/hd/day if their condition score < 3, otherwise they are offered 0.8 kg DM/hd/day of the supplementary feed.

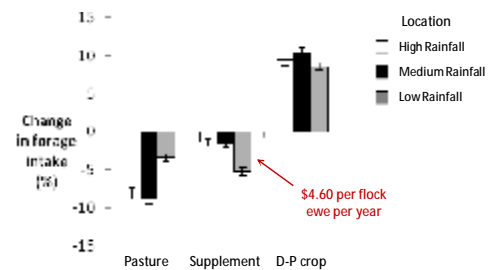
Preliminary study



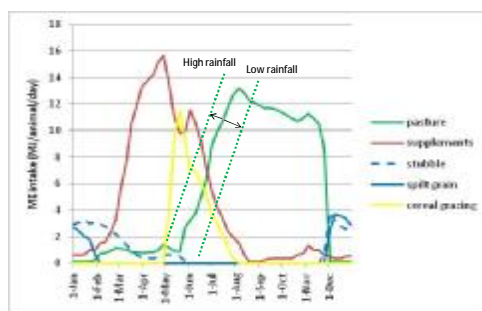
DP wheat c. 10% of annual feed



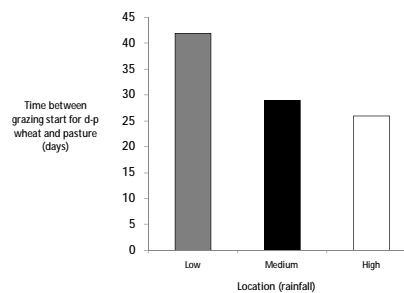
Feedbase substitution differs between locations



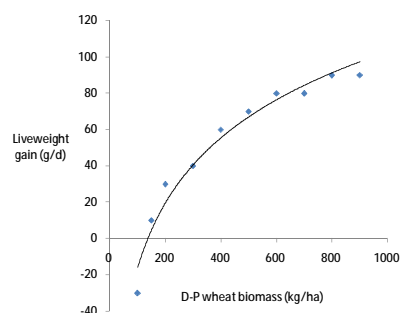
Availability of pastures differs between locations



Pasture is available for grazing later in the low rainfall zone



Weight gain of adult sheep



Conclusions

- Dual-purpose crops can reduce the early winter feed-gap in Western Australia
- The complementary nature of dual-purpose wheat as a component of the feedbase will be affected by farm location
- In lower rainfall areas dual-purpose crops may be more suited to fill winter feed deficits. Whereas in higher rainfall areas, feedbase benefits are more likely to come from pasture deferment

Proposed Simulation Studies

Transect analyses

- 15 locations X D-P crop or not
- Low, medium and high GS rainfall gradient across 5 regions
- Effect on amount of D-P wheat grazed, livestock performance while grazing wheat, utilisation of other feedbase components and crop yields.

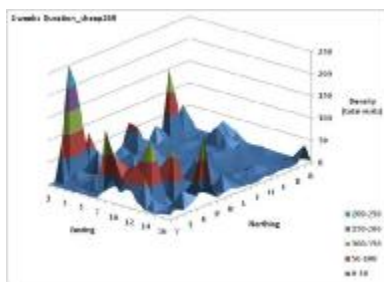
Deferment analyses

- 9 locations (WA) X d-p crop, no d-p crop or d-p crop with 'shadow' pasture grazing X 2 pasture grazing rules (pasture > 500, 1000 kg/ha)
- Effects of changing graze pasture rule (on pasture production, feedbase utilisation, supplementary feeding, wheat yield)
- Effects of location (rainfall and latitude), incorporate transect analysis
- Relationship between growing season rainfall and yield (look at grazing or no grazing interaction)
- Compare value in good versus poor seasons

Transect Study

- 5 regions:
 - WA: Northern Ag, Central Wheatbelt, South Coast
 - SA: Eyre Peninsula
 - Vic: Mallee
- 3 sites per region (GS rainfall: 200, 300, 400)
- Possible sites:
 - Northern Ag: East Binu, Mingenew, Dongara
 - Central Wheatbelt: Merredin, Beverly, Bakers Hill
 - South Coast: Salmon Gums, Scaddan, Esperance AP
 - Eyre Peninsula: Penong, Minnipa, Cummins
 - Mallee: Walpeup, Jeparit, Horsham
- Farm system:
 - Self-replacing Merino x Wheat (WA base model)

Spatial distribution of grazing livestock



WA DP CROPPING PRIORITIES

Grazing dual purpose crops meeting
Department of Agriculture and Food, South Perth
Tuesday 7th December 2010

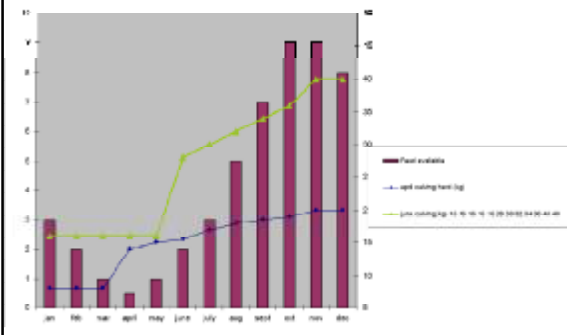
What we know about dual purpose crops	What we don't know about dual purpose crops
With holding periods	With holding periods: the interaction between application and grazing
Hybrids are better biomass producers and yields after grazing	• 12 weeks with holding period - does this need evaluating
Grain is an early sowing thing - if you miss early sowing then you miss grazing	Grazing windows for WA sites from model and phenology trials
The impact of sowing pastures on pasture growth - 4 week rotation/crops instead	Stages? - larger bulk needed
Sow with the right variety before June?	Benefits of grazing of canola (for pest control, disease control in cereals)
Grazing earlier - how late we can go without affecting yield (driven by day length - spring - and temperature - winter)	Grazing for weed management in crop
• Need to wait until you can't pull the plant out (< 4.50kg DM/ha)	• In WA makes it worse, other states are OK
• With smaller flocks producers need to go earlier to stay on-top of growth (multiple grazings)	Phenology
	• Timing to swap winter to spring (DQ) - eg cereals (maturity and lignin)
	• Spring - how early can you go and safely use grazing to control
	What are Plan B's (Spring) if you can't graze?
	Worm resistance / resistance to crop management tools?
	Grazing earlier - how late we can go without affecting yield
	Why do crops grow so quickly than pastures in winter?
	Economics of the whole thing
	Phenology
	• Which varieties - what to sow and when
	Sowing rates
	Is it too post grazing?
	Impact of grazing on soil moisture
	What data do the models need collected during the trials?
	Interventions in 'why' - grass is integrated
	Late sown wheat after canola fodder crop - opportunity for demo

Winter Crop Grazing



David Cox
Waterhatch Farms, Esperance

Feed Curve



1 cow-calf/ha June/July



- **Grazing stubbles (summer)**
- Pre seeding weed control (April)
- **Light grazing of pastures (May)**
- Calving and Grazing of cereals (June to mid August)
- **Excess cattle sold directly off crop**
- Pasture paddocks grazed through spring
- **Weaning onto fresh stubbles or restocking (November)**

Break feeding at 3 cow-calf/ha



100 DSE/ha????



- **\$15000 calf sales = \$3000/ha**
- **\$700/ha barley sales**
- **Average \$1000/ha**





Thankyou and Questions

