

MFS Project Support - CSIRO – High Rainfall Zone dual-purpose cropping project

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TRIAL 2010 - Background

This trial designed and conducted by CSIRO is looking at the grain and graze potential of both cereals and canola at two different sowing dates (ie. early and late sowing). The trial is comparing 10 different cereal and canola varieties (incl hybrids). The plots were grazed periodically prior to flowering / maturation and yields harvested. The trial aims to demonstrate the grazing potential of these dual-purpose crops in specific windows during the growing period which can be combined with a harvestable yield potential.

Results Summary

John Jeffreys

The trial shows that grain yield is still the main profit driver for these long season crops. There is no doubt that time of sowing has had a major yield and gross margin difference in the cereal trial. I reflected similar in the same paddock (Mackellar \$800 per ha difference). The canola was nearly \$300 per ha difference, however this may be due to canola's ability to recover from late and heavy grazing.

Some general points as follows:

- Grazing value of dual purpose crops reduces risk and covers cost of production 1-200%.
- Management of early sown crops is more difficult due to disease and exposure to seasonal risks.
- Management of early sown cereal crops needs further work to realize crop potential (realistic 3mt (\$700) per ha increase).
- Grain **yield** is the main profit driver in systems looking to maximize per ha returns (higher risk).
- Later, high biomass crops grazed once in late August not as suitable to lamb finishing systems which require a longer grazing window. However does suit a system where lactating stock are grazed while pastures spelled.
- Winter canola types provide the opportunity for highest canola returns in this environment.
- Mackellar is still benchmark variety in both sowing windows.
- Winter wheats outperformed Barley, Triticale and Wedgetail wheat varieties in early sowing window.
- Long season spring wheats can still recover from early sowing if more rapid feed production required.
- Budget on one grazing from canola and two from a winter wheat.

John Kirkegaard

Cereals

- **Sowing 1** demonstrates the superiority of the winter wheats in terms of yield
- Appears Urambie outclassed Yambla, Preston did the best of the spring types and Wedgetail hasn't performed. Revenue and Naparoo have suffered under grazing more than most.
- **Sowing 2** everything did quite well in the mild finish but Endeavour and Mackellar are standouts. (The Sowing 2 data is likely to be an OVERESTIMATE of absolute yield although John is confident the yields were quite good. Caution is applied because of the small harvest sample taken.)

Please note that at each sowing time ALL varieties were grazed together so that some varieties were disadvantaged (ie if one could graze them all separately according to their own timing we might have had different results).

Canola

- In general, **yields** range from 2.5 – 3.5 t/ha with exception of the TT variety
- Overall there is little yield difference between the early and late sowing
- No evidence that winter types did better with early sowing – trend was reverse
- No evidence that spring types did better with later sowing – trend was reverse
- **Varieties** - Overall *winter types out-yielded spring types* in both sowing times
 - Winter (Mean of 3) - Early sown =2.9 t/ha; Late sown =3.5 t/ha
 - Spring (Mean of 3) - Early sown =2.5 t/ha, Late sown =2.5 t/ha (TT excluded)
- **Grazing** - Overall grazing had little impact on yield (Table 1)

Take-home story

- The winter canola types have proven their worth at both sowing times in 2010.
- The failure of early sown canola crops (especially winter types) to perform better is of interest, but the favorable finish probably eliminates much of the value of sowing early (for seed yield) and large early-sown crops may be prone to more disease during the long wet seasons such as 2010 especially when not grazed. Nitrogen may also have been limiting.
- In the early sown cereals, can experience disease problems because of wet year
- In the cereals, grain yield is still driving profitability and need to be aware of disease risk with earlier sown crops and how to address.
- In this year (2010), the extra grazing gained by sowing early was not offset by grain yield reduction because of disease affecting final yields.

Rainfall info 2010

- GSR TS1 422.8 mm Fallow 151 mm
- GSR TS2 407 mm Fallow 158 mm

CEREALS

		Variety	Measured DM removed	kg/ lamb per ha	\$ per ha grazing	grain mt/ha	\$ per ha grain	Est lamb mgt costs / ha	Crop costs / ha	GM / ha	
Grazed S1	Barley	Urambie	2000	300	\$ 600.00	4.4	\$ 792.00	\$ 80.00	\$ 353.00	\$ 959.00	
		Yambla	2300	345	\$ 690.00	4.6	\$ 828.00	\$ 80.00	\$ 353.00	\$ 1,085.00	
	Triticale	Endeavour	1600	267	\$ 533.33	4.5	\$ 1,035.00	\$ 80.00	\$ 353.00	\$ 1,135.33	
		W wheat	Mackellar	900	168	\$ 336.00	6	\$ 1,380.00	\$ 80.00	\$ 353.00	\$ 1,283.00
		Revenue	1400	261	\$ 522.67	5	\$ 1,150.00	\$ 80.00	\$ 353.00	\$ 1,239.67	
	Spring	Naparoo	1700	317	\$ 634.67	4.5	\$ 1,035.00	\$ 80.00	\$ 353.00	\$ 1,236.67	
		Wedgetail	1600	299	\$ 597.33	3.8	\$ 912.00	\$ 80.00	\$ 353.00	\$ 1,076.33	
		Preston	2900	387	\$ 773.33	4.8	\$ 1,104.00	\$ 80.00	\$ 353.00	\$ 1,444.33	
		HRZ03	3000	400	\$ 800.00	3.5	\$ 805.00	\$ 80.00	\$ 353.00	\$ 1,172.00	
		Bolac	3100	413	\$ 826.67	3.7	\$ 888.00	\$ 80.00	\$ 353.00	\$ 1,281.67	
Ungrazed S2	Barley	Urambie				8.7	\$ 1,566.00			\$ 1,213.00	
		Yambla				7.3	\$ 1,314.00			\$ 961.00	
	Triticale	Endeavour				10.5	\$ 2,415.00			\$ 2,062.00	
		W wheat	Mackellar				11.7	\$ 2,691.00			\$ 2,338.00
		Revenue				8.7	\$ 2,001.00			\$ 1,648.00	
	Spring	Naparoo				7.1	\$ 1,633.00			\$ 1,280.00	
		Wedgetail				8.1	\$ 1,944.00			\$ 1,591.00	
		Preston				9.8	\$ 2,254.00			\$ 1,901.00	
		HRZ03				8.9	\$ 2,047.00			\$ 1,694.00	
		Bolac				7.1	\$ 1,704.00			\$ 1,351.00	

Sowing 1(S1) [Sown 11 March, grazed twice during 14-29 June and 17-28 August]

Sowing 2 (S2) [Sown 14 April, grazed once during 17-28 August]

CANOLA

	Variety	Measured DM removed	kg/ lamb per ha	\$ per ha grazing	grain mt/ha	\$ per ha grain	Est lamb mgt costs / ha	Crop costs / ha	GM / ha
Grazed S1	Wingred	1500	250	\$ 500.00					
	Tarus	1200	200	\$ 400.00	2.8	\$ 1,433.60	\$ 50.00	\$ 454.00	\$ 1,329.60
	CBI208	800	133	\$ 266.67	2.9	\$ 1,484.80	\$ 50.00	\$ 454.00	\$ 1,247.47
	CBI306	1200	200	\$ 400.00	2.8	\$ 1,433.60	\$ 50.00	\$ 454.00	\$ 1,329.60
	CBI406	1600	267	\$ 533.33	2.4	\$ 1,228.80	\$ 50.00	\$ 454.00	\$ 1,258.13
	Maxol	1300	217	\$ 433.33	2.9	\$ 1,484.80	\$ 50.00	\$ 454.00	\$ 1,414.13
	46y78	3000	360	\$ 720.00	1.7	\$ 870.40	\$ 50.00	\$ 454.00	\$ 1,086.40
	Hyola 76	5200	624	\$ 1,248.00	2.3	\$ 1,177.60	\$ 50.00	\$ 454.00	\$ 1,921.60
	Garnet	3100	372	\$ 744.00	2.6	\$ 1,331.20	\$ 50.00	\$ 454.00	\$ 1,571.20
	Marlin	1300	217	\$ 433.33	1.2	\$ 614.40	\$ 50.00	\$ 454.00	\$ 543.73
Ungrazed S2	Wingred								
	Tarus				3.9	\$ 1,996.80			\$ 1,542.80
	CBI208				3.9	\$ 1,996.80			\$ 1,542.80
	CBI306				3.3	\$ 1,689.60			\$ 1,235.60
	CBI406				2.8	\$ 1,433.60			\$ 979.60
	Maxol				3.2	\$ 1,638.40			\$ 1,184.40
	46y78				2.8	\$ 1,433.60			\$ 979.60
	Hyola 76				2.7	\$ 1,382.40			\$ 928.40
	Garnet				2.7	\$ 1,382.40			\$ 928.40
	Marlin				1.5	\$ 768.00			\$ 314.00

S1 = sowing date 1 S2 = sowing date 2



TRIAL 2011 – main focus is on disease control

- 1 sowing date (in between two dates from 2010) ie. early April, will be grazed Aug 10th to end Aug 2011
- trialing a boron spray on canola to look for response
- a lot of disease seed tmts in this trial ie. seed treated insecticides and fungicides to address disease problems
- Aug 2011, trialing an “in crop” fungicide spray on canola for black leg
- all trial is grazed this year, no un-grazed sections and all winter types

(1) Wheat disease control experiment

Aim: To investigate disease control measures for early-sown, grazed winter cereals

Background: In 2010 early-sown crops (March) suffered significant yield penalties compared with later sown crops (April) which offset the income derived from grazing. We are investigating the impacts of variety, insect control and fungicides on the performance of dual-purpose winter cereals.

Treatments:

Varieties; Mackellar, Revenue, CS170, Endeavour
Insecticide; Imidacloprid (Emerge seed dressing 240 ml/100kg)
Fungicide; Impact (on-fertiliser 400 ml/ha)

Grazing; 12 August – 28 August (lambs and wethers) = **1000 dse grazing days/ha**

Table 1; Biomass production (t/ha)

Treatment	Biomass 8 July	Biomass 8 August (Start graze)	Biomass 31 August (Lock-up)
Mackellar (untreated)	1.4	1.6	2.1
Mackellar + Impact	1.7	1.5	1.7
Mackellar + Insect	1.5	1.5	1.8
Mackellar + Impact/Insect	1.1	1.2	2.0
Revenue (untreated)	1.3	1.6	1.9
Revenue + Impact	1.2	1.5	1.5
Revenue + Insect	1.5	1.7	1.8
Revenue + Impact/Insect	1.3	1.4	1.8
CS170 + Impact/Insect	1.0	1.3	1.6
Endeavour + Impact/Insect	2.1	2.3	2.6

- No consistent effect of treatments on biomass available for grazing.
- Crops growing 8-12 kg/ha/day in winter; biomass maintained during grazing
- Triticale provided more grazing biomass (2.3 t/ha) than wheat (1.5 t/ha)
- Average cereal winter growth rates 8 – 12 kg dry weight /ha



+ IMIDACLOPRID

CONTROL



CONTROL

+ IMIDACLOPRID (EMERGE)

(2) Break crop experiment

Aim: To investigate the benefits of canola break crop for early-sown, grazed winter wheat

Background: In 2010 early-sown wheat crops (March) suffered significant disease levels and yield penalties despite being sown after canola. Is a one year canola break crop sufficient to control disease in early-sown HRZ crops?

Treatments:

2010 crops; Wheat (Mackellar), Triticale (Endeavour), Barley (Urambie), Canola (Taurus)

2011 crop; Mackellar wheat

Grazing; 12 August – 28 August (lambs and wethers) = **1000 dse grazing days/ha**

Table 1 - Biomass production (t/ha)

Treatment (2010 crop)	2010 crop yield (t/ha) (grazed)	April 2011 Take-all level (DNA)	Biomass 8 Aug 2011 (Start graze)	Biomass 31 Aug 2011 (Lock-up)
Wheat (weedy fallow)		66	1.5	1.1
Triticale (weedy fallow)		68	1.5	1.2
Barely (weedy fallow)		113	1.4	1.3
Canola (weedy fallow)	1.9	57	1.3	1.1
Canola (clean fallow)	1.9	19	1.8	1.8

- Volunteer cereals and weeds grew after harvest in summer
- Weedy summer fallow has limited break crop benefit even after canola
- More wheat biomass after weed-free canola

(3) Canola – varieties, disease control and boron

Aim: To fine-tune agronomy for grazed winter canola

Background: Early-sown winter canola (Taurus) has proven successful for dual-purpose in HRZ although the number of varieties tested and the management of blackleg and soil fertility are of interest. We are investigating the yield performance of new varieties, new blackleg control options (Presaro) and boron treatments.

Treatments:

Varieties; Taurus, Abakus, Rohan, Xenon, CBIW208, Brazzil (all with Impact and Boron)

Fungicides; Taurus only - Impact (fertiliser 400 ml/ha) or Jockey (20L/t) +/- Presaro (450ml/ha)

Boron; Taurus only – with Impact +/- Boron

Grazing; 12 August – 26 August (14 lambs) = **1000 dse grazing days/ha**

Table 1 - Blackleg and biomass production

Treatment	Blackleg % cotyl. 8 May	Blackleg 3 Aug	Biomass 3-Aug (pre-graze)	Biomass 31-Aug (post-graze)
Abakus + Imp (+ Boron)	8	30	1.8	1.1
Rohan + Imp (+ Boron)	10	19	2.0	1.4
Xenon + Imp (+ Boron)	6	28	1.7	1.2
CBIW208 + Imp (+ Boron)	6	32	1.2	0.8
Brazzil + Imp (+ Boron)	5	27	1.2	0.7
Taurus + Imp (+ Boron)	10	24	1.5	1.0
Taurus + Imp (- Boron)	-	-	1.7	1.2
Taurus (+ Boron)	41	42	1.0	0.7
Taurus (+ Boron + Prosaro)	-	-	1.3	0.8
Taurus + Imp (+ Boron + Prosaro)	-	-	1.3	1.1
Taurus + Jock (+ Boron)	33	40	1.7	0.8
Taurus + Jock (+ Boron + Prosaro)	-	-	1.1	1.1

- Impact has been effective in reducing blackleg infection compared to Jockey
- Some differences in early biomass between varieties (1.2 to 2.0 t/ha)

