

“Crop Sequencing and Transition Trial”

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Trial Objectives: To explore rotational options for the South-East region with the aim of improving yield and water use efficiency of these, and subsequent crops.

Trial Duration: 2011-13

Location: Naracoorte

Farmer Co-operators: Ranch Miles

2011 trial results

The trial was sown north of Naracoorte in June 2011 with different crops being sown at different times.

Soil moisture was measured before sowing and during the growing season drained upper limit, crop lower limit and bulk density were measured. After harvest all plots have been measured to determine final soil water and so to measure the amount of water used for each crop.

Treatments were cut at flowering to measure dry matter accumulation. Other samples were cut at maturity to determine total production and harvest index. Samples have been provided for measurement of N accumulation from the bean crop in the plots and that surrounding the trial. Samples are also being supplied to Dr Ashlea Doolette to determine phosphorus accumulation in the wheat, beans and peas.

Treatments are detailed in Table 1 which details the harvested grain yields. Additional treatments were a sub clover (Antas) pasture and a canola crop that was mown and removed in mid October to simulate hay cut after a frost event. The canola produced 8.4 t/ha dry matter when cut on 19 October. A subsample was taken two weeks earlier to test quality:

- Protein 16.47%
- Neutral detergent fibre 42.2%
- Digestibility 65.5%
- Metabolisable energy 9.63%

The Antas pasture produced 7.55 t/ha of dry matter when harvested in November 2011.

All plots were generally weed free except for herbicide resistant ryegrass in the wheat plots. Weed numbers have been counted for each weed plot and varied from 2.6 plants m⁻² for the wheat sown in 15 cm rows up to 11.3 plants m⁻² for the wheat sown in 30 cm rows.

Table 1. Grain yield of various treatments sown in 2011

entry	kg/ha	% site mean
Barley (spring)	2952	108
Beans	2658	97
Canola for grain	2286	84
Canola grain and graze	2235	82
Peas (spring)	1440	53
Peas (Winter)	3125	114
Safflower (spring)	1412	52
Wheat 30cm rows	3506	128
Wheat for grain	4001	146
Wheat grain and graze	3754	137

Site mean	2737
CV%	11.96
lsd(0.05)	592.4

Grazing of the canola plots had no effect on grain yield (Table 1), while grazing of the wheat had little effect.

Plans for 2012

Set up new rotation trial with treatments similar to those used in 2011.

Sow wheat over all plots from the 2011 trial. Treatments used to be a range of nitrogen applications and two sowing dates.

Acknowledgements:

Work at this trial site is funded by both CSIRO and GRDC through Grain & Graze2.



“East Grain& Graze 2, Growing Biomass”

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Trial Objectives: Investigating the dry matter accumulation and timing of a range of pasture species and mixes and comparing them to the dry matter produced by crops that are grown to be grazed before being shut up for grain production or cut for hay from silage.

Trial Duration: 2011-13

2011 Results:

Table 1: Assessment of alternative species

entry	kg/ha dry matter	% site mean
Hyola50	8515	164
Bolta	6033	116
Ononis alopecuroides	5566	107
Trigonella balansae	5138	99
Trigonella calliceras	5007	97
Persian	4438	86
Melilotus elegans	3653	70
Hedysarium flexuosum	3136	61
Site mean	5186	
CV%	23.42	
Isd(0.05)	2173	

Table 2: Biomass Evaluation of different ryegrass species

entry	harvest 1		harvest 2		harvest 1 and 2	
	kg/ha	% site mean	kg/ha	% site mean	kg/ha	% site mean
Atomic	4135	96	3389	120	7070	105
Awesome	4363	101	2663	94	6933	103
Banquet	4407	102	2441	86	6173	92
Barberia	4029	93	2426	86	6334	94
Bealey	3808	88	2377	84	5549	82
Hulk	4420	103	2669	94	6926	103
Icon	3933	91	3525	125	6968	104
Platinum	4164	97	2325	82	5941	88
Tetila	4992	116	2993	106	7797	116
Thunder	4863	113	3058	108	7463	111
VicPerRye	4281	99	2464	87	6092	91
Winterstar	4362	101	3583	127	7534	112
Site mean	4313		2826		6732	
CV%	14.67		7.952		10.62	
Isd(0.05)	NS		439.1		1212	

Table 3: Biomass Production of 2 ryegrass varieties with varying Nitrogen rates

Variety plus N rate		Harvest 1		Harvest 2		Total	
Variety	Nitrogen Rate	kg/ha	% site mean	kg/ha	% site mean	kg/ha	% site mean
Platinum	0 kgN/ha	3708	85	3240	86	6998	86
Platinum	100 kgN/ha	4284	98	4456	118	8738	107
Platinum	200 kgN/ha	4886	111	3331	88	8410	103
Platinum	400 kgN/ha	4736	108	3484	92	8172	100
Winterstar	0 kgN/ha	4646	106	3586	95	8167	100
Winterstar	100 kgN/ha	4492	102	4209	112	8725	107
Winterstar	200 kgN/ha	4127	94	4044	107	8096	99
Winterstar	400 kgN/ha	4211	96	3834	102	8136	100

Site mean		4386		3773		8180	
CV%		10.41		13.34		8.48	
lsd(0.05)		858		912.6		1286	

Comments:

Harvest dates for the ryegrass trials were 22 September and 3 November 2011, while the harvest date for the legume trial was 2-3 November.

The best legumes produced 5-5.5 t/ha dry matter when cut in early November, while canola (Hyola 50) produced about 8.5 t/ha dry matter. The production of canola was similar to that cut at the Grain and Graze 2 site north of Naracoorte.

The ryegrass varieties produced between 3.8 and 5 t/ha dry matter when cut on 22 September but there was no significant difference between varieties. The later cut in early November produced between 2.3 and 3.6 t/ha dry matter with a significant difference between varieties. The highest yielding varieties over both cuts were Tetila, Winterstar and Atomic with over 7 t/ha dry matter. Greater levels of production would have been expected but very little rain fell after early September and the heavy clay soil cracked and lost soil water.

The trial evaluating the effect of varying nitrogen rates on production of Winterstar and Platinum ryegrass produced very confusing data. The nitrogen resulted in an increased yield of dry matter with Platinum ryegrass over the two harvests. However, there was no effect of nitrogen rate on Winterstar at either harvest date. Possibly the dry finish to the season restricted any response to nitrogen.

All plots will be continued in 2012 to investigate regrowth or germination of annuals while some additional plots will be sown in 2012.