



BCG Farming Systems – 2001 Production Report

Summary

2001 was the second year of complete monitoring and recording at the BCG's Farming Systems site.

A total of 261mm of rain fell during the calendar year of 2001, with 197mm falling in the growing season. Although the break of the season was late (June 5) a mild winter and a cool spring compensated and some good crops were grown.

2001 production trends were consistent across all systems with champions opting to increase the area of cereals sown at the expense of pulse crops. The area under canola and pasture/fallows remained constant.

Wheat yields averaged 2.5 t/ha at the site and ranged from 2 t/ha in a resown Reduced Till paddock up to 3.1 t/ha in a Fuel Burner paddock (sown on fallow). Barley averaged 2.5 t/ha. Interestingly, the highest yielding barley crop (Hungry Sheep 3 t/ha) and the lowest yielding (Zero Till 2.1 t/ha) had the same rotation (pulse→wheat→barley). Refer to Table 2.

Pulse and canola crops all yielded poorly (<1 t/ha) owing to the late break, low growing season rainfall, subsoil constraints and frost damage (Refer Table 2). The Zero Till lentil crop also suffered from Simazine damage.

The major weeds present during the 2001-growing season were wild oats, annual ryegrass, mustard, medic, and whip thistle. Brome grass, barley grass and sow thistle were also at commercially unacceptable levels in many paddocks. Volunteer wheat was a major problem in those paddocks dry sown to barley following wheat.

Cereal root disease was detected in 4 of the 16 paddocks cropped to wheat and barley in 2001. The diseases identified were Take-all and *Pratylenchus* spp. (Refer Table 3). Foliar disease was present in all crops but at low levels and did not impact on yield or grain quality.

The Hungry Sheep system has been the most profitable system based on the 2-year average gross margin over the 2000 and 2001 seasons at \$261/ha (Table 4). The Zero Till system had the greatest area sown to pulse and canola crops over the past two seasons, sowing on average 50% of available area. This system has also delivered the lowest return – 2 year-average gross margin \$112/ha. (Table 4).

When viewing these results remember that a complete cycle of each system's rotation has not yet been completed. These results therefore may not be indicative of the long-term performance of each system – this will only occur with time!

Rainfall and season conditions

The total rainfall received at the Systems site was 261mm for 2001, with 197mm falling during the growing season (April-October)(Table 1) – making the season decile 2.3. The break of the season occurred on 5/6 June when 13mm of rain fell. Although the first five months of the year were dry (60mm rain) the spring rain in 2000 ensured some stored soil moisture.

The mild winter compensated for the late break allowing crops to develop more rapidly than usual over this period. The cool weather over the months of October and November created a soft grain filling period – average daily maximum temperature was 1-2 °C below the long-term average and only 3 days above 30 °C were recorded.

Table 1: Monthly rainfall for 2001

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total	18	5	29	0	8	25	57	47	41	19	10	2
Cum total	18	23	52	52	60	85	142	189	230	249	259	261

Production trends

In 2001 the ‘champions’ elected for low risk cereal-based options as a result of the late break, high barley prices and relatively poor pulse crop performance in 2000.

Yield results

Wheat yields averaged 2.5 t/ha at the site and ranged from 2 t/ha in a resown Reduced Till paddock up to 3.1 t/ha in a Fuel Burner paddock (sown on fallow). Barley averaged 2.5 t/ha. Interestingly, the highest yielding barley crop (Hungry Sheep 3 t/ha) and the lowest yielding (Zero Till 2.1 t/ha) had the same rotation (pulse→wheat→barley). Refer to Table 2.

Pulse and canola crops all yielded poorly (<1 t/ha) owing to the late break, low growing season rainfall, subsoil constraints and frost damage (Refer Table 2). The Zero Till lentil crop also suffered from Simazine damage.

Table 2: Average yields (t/ha) for each crop type during 2001 (number of paddocks).

Crop	Site average	Fuel Burner	Hungry Sheep	Reduced Till	Zero Till
Wheat	2.53 (11)	2.98 (2)	2.26 (2)	1.97 (2)	2.09 (2)
Barley	2.54 (5)	2.87 (1)	3.00 (1)	2.38 (2)	2.08 (1)
Canola	0.55 (4)				0.36 (1)
Lentil	0.38 (2)		0.43 (1)		0.32 (1)
Field pea	0.93 (3)				
Stock rate*	2.4	1.3	8	1.3	No stock

* DSE/ha - assuming a DSE to be a medium framed 50 kg dry sheep.

Weed issues

The major weeds present during the 2001-growing season were wild oats, annual ryegrass, mustard, medic, and whip thistle. Of lesser importance but present at commercially unacceptable levels were Brome grass, barley grass and sow thistle.

Volunteer wheat was a major problem in those paddocks dry sown to barley following wheat. Contamination levels were sufficient to cause down grading to feed (had the barley grain protein been within the acceptable limits for malt).

The following weeds are potentially important in future years:

- Marshmallow has been detected in two Zero Till (16, 22) and two Reduced Till (19, 30) paddocks
- White ironweed has been detected in one Zero Till paddock (27).
- Wild radish was detected for the first time at the site – in Hyden canola growing in a Standard paddock (20)
- Pressure from populations of Wild oat, Annual ryegrass, Brome grass and, to a lesser extent, Barley grass will be challenging to all systems. These grass weeds dominated weed populations in cereals this season, especially in paddocks dry sown.

Disease issues

All crops were monitored for the presence of root and foliar diseases during the year.

Root disease: Cereal root disease was detected in 4 of the 16 paddocks cropped to wheat and barley in 2001. The diseases identified were Take-all and *Pratylenchus* spp. (Refer Table 3).

Take-all was present in low levels in all three cereal crops of the Fuel Burners system (paddocks 10, 18 and 29). All three of these paddocks have a similar history with cereal → break (peas or medic/fallow) → cereal. Low numbers of volunteer cereals, wild oat and barley grass during the non-cereal phase was enough to host the Take-all fungus and carry it through into the 2001 cereal crops.

Pratylenchus was at low to low → moderate levels in two of the three Fuel Burners cereal crops (paddocks 10 and 29) and at low → moderate levels in one Hungry Sheep wheat crop (paddock 26). All of these paddocks have a *Pratylenchus* susceptible – resistant – susceptible crop rotation. Low background wild oat populations during the resistant break crop phase allowed the nematode to survive and attack the 2001 cereal crops.

Table 3: Detectable cereal root disease issues in 2001 crops

Paddock	System	Take-all	<i>Pratylenchus</i> spp.
10	Fuel Burners	Low levels	Low→Moderate levels
18	Fuel Burners	Low levels	Below detection
26	Hungry sheep	Below detection	Low→Moderate levels
29	Fuel Burners	Low levels	Low levels

Foliar disease: Foliar disease was present at low levels in all crops during 2001 but their impact was minimal. Foliar diseases identified at the site were Spot Form of Net Blotch in barley, Yellow Leaf Spot in wheat, Ascochyta in Field peas, Ascochyta in lentils (no Botrytis) and Blackleg and *Altenaria* in canola.

Economic performance

The Hungry Sheep system has been the most profitable system based on the 2-year average gross margin over the 2000 and 2001 seasons (Table 4).

Zero Till system has had the greatest area sown to pulse and canola crops over the past two seasons, sowing on average 50% of available area. This system has delivered the lowest return (Table 4). Fuel Burners (10%), Reduced Till (10%) and Hungry Sheep (20%) have sown far less of the available area to pulse and canola crops.

Table 4: 2-year average gross margin for each system over the 2000 and 2001 seasons.

	Fuel burner		Hungry sheep		Reduced Till		Zero Till	
	2000	2001	2000	2001	2000	2001	2000	2001
Income	286	349	375	356	274	338	224	294
Variable costs	118	81	115	94	100	113	159	136
Gross Margin	168	268	260	262	174	225	65	158
2-yr av. GM	218		261		200		112	

Livestock figures were based on a medium frame merino ewe flock with 90% lambing. The gross margin was estimated to be \$25.30/DSE for all systems except the Hungry Sheep system - it was estimated to be \$19.80/DSE due to the higher costs of establishing oat and medic pastures and feeding with supplementary grain.

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Acknowledgments

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