Cropping systems

In collaboration with farmers Michael Jaeschke, Matt Dare and SANTFA. Funded by SAGIT.

Key findings

- The disc and the early sown no-till tillage systems produced the highest grain yields, 1.41t/ha and 1.36t/ha respectively.
- The early sown no-till system had the lowest protein and the highest screenings.
- The disc tillage treatment had the least available soil nitrogen in autumn.

Why do the trial?

To compare the performance of 3 seeding systems and 2 nutrition strategies. This is a rotation trial (funded by SAGIT) to assess the longer term effects of seeding systems and higher fertiliser input systems.

How was it done?

Plot size	35m x 13m		**Fertiliser**	DAP @ 50kg/ha + 2% Zn
Seeding date	No-till, Early	16th May	**Seeding rate**	100kg/ha JNZ
	Disc	30th May		
	No-till	3rd June		
	Strategic	6th June		

This trial is a randomised complete block design with 3 replicates, each containing 3 tillage treatments and 2 nutrition treatments. The no-till treatment has two times of sowing, aiming to demonstrate the benefits of dry or earlier sowing. The strategic and no-till treatments were sown using local farmers seeding equipment, Michael Jaeschke and Matt Dare. The disc seeding treatments were sown with the SANTFA trial seeder using a Bertini disc. The trial was sown with Clearfield Janz wheat at 100 kg/ha.

Table 1: Previous crops in the long term cropping systems trial at Hart.

2007	2006	2005	2004	2003	2002	2001	2000
JNZ Wheat	Kalka Durum	Kaspa Peas	SloopSA Barley	Yitpi Wheat	Janz Wheat	Canola	Malting Barley

Tillage treatments:

Disc – sown into standing stubble with a Bertini disc seeder, 275mm (11") row spacing.

Strategic – worked up pre-seeding, sown with 100mm (4") wide points at 175mm (7") row spacing with finger harrows.

No-till – sown into standing stubble in 1 pass with narrow points with 225mm (9") row spacing and press wheels.

Nutrition treatments:
Medium & High – due to low rainfall nutrition treatments were not applied in 2008. In previous years urea has been applied post emergent at 60kg/ha for the medium and 120kg/ha for the high nutrition treatment.

Soil nitrogen (0-60cm) was measured in autumn on 27th March and plant tissue tests were conducted at the 4 leaf stage. Dry matter (DM) & crop nitrogen measurements were taken on 25th August 08.

Results

Sowing system produced significant differences in grain yield, grain protein and screening (Table 2).

The disc was the highest yielding treatment in the trial for 2008 (1.41t/ha) but was not significantly different to the early no-till treatment (1.36t/ha).

The strategic treatment produced the highest protein at 17.5% while the early no-till had the lowest at 14.4%.

The early no-till treatment produced the highest screenings in the trial at 11.5%.

Table 2: Grain yield (t/ha), protein (%) and screenings (%) averaged across nutrition treatments.

Tillage	Grain yield (t/ha)	Protein (%)	Screenings (%)
Disc	1.41	16.0	7.3
No-Till	1.06	16.8	6.3
Early No-Till	1.36	14.4	11.5
Strategic	0.94	17.5	8.0
LSD (0.05)	0.23	1.0	2.8

Available soil nitrogen (0-60cm) was 127 and 143kg nitrogen/ha for the medium and high nutrition respectively. Although the high nutrition treatment is 16kg/ha higher, it was not significant.

The disc treatment had 26% less available soil nitrogen in March compared with the no-til and strategic treatments and by the 25th August had 78% more dry matter and 30kg/ha more crop nitrogen than the other treatments (Table 2).

The leaf tissue test results show that there was no difference in leaf zinc or phosphorus due to tillage treatments or nutrition.

Table 2: Available soil nitrogen (0-60cm), tissue test results for zinc (Zn) & phosphorus (P), dry matter (DM) and crop nitrogen (N) results for tillage treatment.

Tillage	Available soil nitrogen (kg N/ha)	Tissue test (%) (4 leaf)		DM (t/ha)	Crop N (kg N/ha)
		Zn	P		
Disc	109.2	27.5	0.4	1.6	65.5
Strategic	148.2	38.5	0.3	0.7	29.5
No-till	148.2	28.0	0.4	0.9	36.0
LSD (P<0.05)	5.1	ns	ns	0.3	12.9