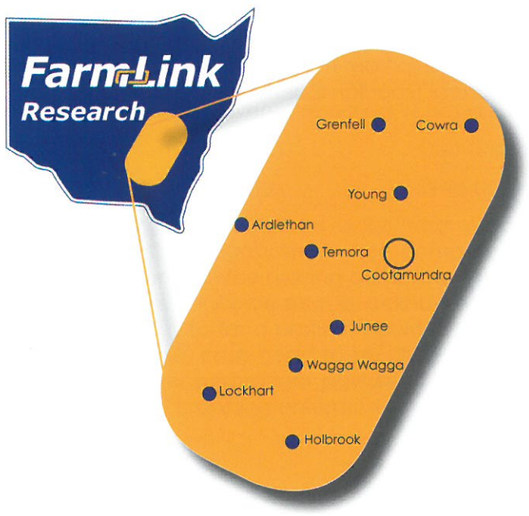
FarmLink
Research Report 2012
07

Disc vs Tyne Seeder Illabo Demonstration 2012

2012 Demonstration Site



Project Partners

FarmLink Research

Tony Lehmann, Hillside

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GRASSROOTS AGRONOMY

Preamble

The Disc vs Tyne demonstration site continues to attract the interest of growers. The FarmLink site at Illabo has completed its fifth year. The paddock is split equally between the two treatments. Each treatment has been re-sown each year using the same seeder. This year Tony used his own Flexicoil seeder to plant the tyne area. In past years it was generously sown by the Moloney family.

Yield results for 2012 were not significantly different between the seeding systems. Under Canola in 2010 there was no variation recorded between the two seeders. This lack of variation will encourage growers considering adopting the disc seeder technology but care should be taken to evaluate both systems in regards to the whole crop production system.

A collaborative GRDC trial, managed by Greg Condon Grassroots Agronomy looking at herbicide efficacy and crop safety in 2010 highlighted the potential for crop damage with disc seeding systems, (see FarmLink 2010 Research Report). Selection of herbicides, rates, soil type and manufacturer differences should be carefully considered.

Another useful reference is research carried out in South Australia as part of GRDC projects UA00105 and UA00113 by Sam Kleeman, Jack Desbiolles, Gurgeet Gill and Chris Preston. They investigated the impact of a range of herbicides and disc configurations on crop safety and weed control.

No-till seeding is part of a crop management package that includes stubble retention, summer fallowing, timely sowing, canopy management, weed and disease control.

Aim

To assess the differences between disc and tyne seeding systems in commercial practice.

Method

A paddock scale area was sown at Illabo with areas split between disc and tyne seeders. Areas were resown by the same seeders in 2008-09-10-11-2012. Data has been collected on establishment, NDVI, tillers, heads, grain yield, grain quality and weed densities

Seeders

John Deere single disc opener on 305mm spacing. The disc was fitted with depth wheels, press wheels and Aricks wheels to minimise hair pinning and improve herbicide incorporation. Flexi-Coil bar and tynes on 300mm spacing. Knife points and press wheels.

Photo 1: Flexicoil bar.

Photo 2: Lehmann JD Disc seeder

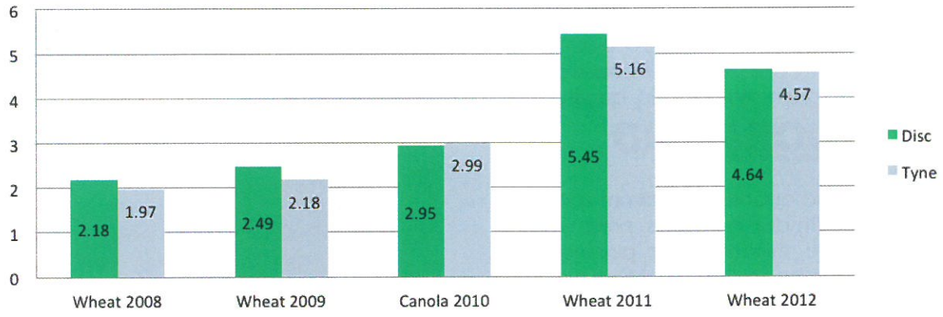
Photo 3: Disc (rhs) area post sowing compared to Tyne area (lhs).

Photo 4: Disc (rhs) area compared to tyne area (lhs).

Table 2. Site results Illabo Disc vs Tyne, 2012.		
Seeding Implement	**Disc**	**Tyne**
Emergence	79 plants/m^2	86 plants/m^2
Yield*	4.64 t/ha	4.57 t/ha
WUE	15.5 kg/mm	15.2 kg/mm

* Yield kg/ha / GSR – 60mm + 30% summer and autumn rainfall = 300mm

Table1: Site details Illabo Disc vs Tyne, 2012.	
Paddock preparation	Soil Test – Colwell P 67, pH 5.7 $CaCl_2$
Pre-sowing	Double knock R/up then Gramoxone + Diuron
Sowing	5/5/12 Wedgetail 50kg/ha + zinc, 100kg/ha MAP + impact
Post sowing	750mls MCPA Lve, 5gms Ally, 50ml Brodal, 200ml Lontrel Crusader late post emergent for brome and wild oats
Top Dressing	30/6/12 + 30 units N. 15/8/12 + 50 units N
Harvest	10/12/12
Rainfall	200 mm GSR, 533mm 1st Nov 11 – 31st March12



Graph 1: Disc vs Tyne Illabo yields 2008 -2012.

Discussion

In 2012 there was no significant difference in yields between the disc and tyne seeders. Early dry matter production was measured in July 2012 using a green seeker and there was a significant reduction in the dry matter of the disc system at this time when analysed with a paired Ttest. This might be attributable to slightly lower plant densities in the disc system but the co-operator has in the past observed reduced vigour from the disc seeding system. Lower early vigour can result in improved harvest index. That is the plants produce a higher percentage of grain as opposed to dry matter.

In 2008 and 2009, which were below average rainfall years, the JD disc seeding system performed well in comparison to the Flexi-coil tyne and press wheels at Illabo. This may be a result of lower soil disturbance in the zero till disc seeder retaining slightly higher soil moisture. Other factors could be lower N mineralisation, pre-emergent herbicides and Rhizoctonia have reduced crop biomass under the JD disc seeding system.

This may have given created higher levels of soil moisture being available at maturity compared to the tyne seeder. Harvest index weights, plant, tiller and head counts have not shown wide variation between the two systems in the two low rainfall years.

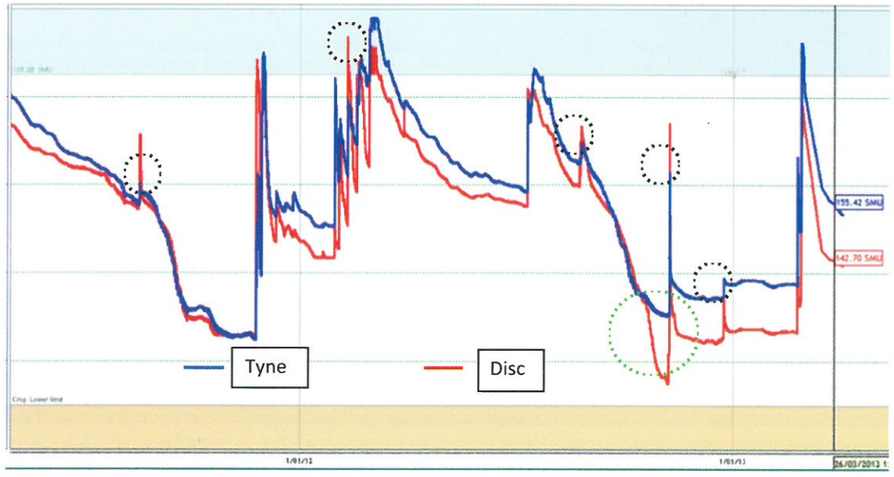
In the summer of 2009-10 there were greater numbers of hairy panic and goose foot, in the tyne treated area. Weeds were treated early and would have had minimal impact on soil N and moisture levels. The disc system area required an extra chemical application to control barley grass during the 2009 season. The tyne system contained greater numbers of hairy panic in 2010-11 and 2011-12 over summer.

Under Canola in 2010 both systems yielded equally. It was thought that the disc seeder treatment may have suffered from reduced biomass during the establishment and growth phase of the crop. There were no visible signs of difference between treatments during the growing season of 2010. Establishment was similar as were weed burdens which were very light.

Wheat yields in 2011 were similar with both systems recording over 5t/ha. To collect yield information each seeder area was split into two separate blocks of 0.5ha and 1ha size. These were harvested and weighed individually. The smaller 0.5ha Disc block contained spray rig wheel tracks and this would have had a detrimental impact on the yield of this area.

Wheel tracks were 90cm wide out of a total area of 11m or equivalent to a percentage of 8.18% of the total area. If this is factored in, the overall yield averages were disc at 5.45t/ha compared to tyne at 5.16t/ha. This figure is consistent with the differences between the second blocks individually harvested in 2011 and yields from previous years 2008 and 2009 (drier than average years).

300kg/ha of yield is substantial. This would equal 300t over 1000ha of wheat crop.
Calculation: (1000ha x 0.3t/ha) 300t at $180/t = $54,000.00



Graph 2: Disc vs Tyne Illabo soil moisture levels.

A paired set of moisture probes were installed at the Illabo site to measure soil moisture levels during the season. Measurements were recorded at 28, 38, 58, 78, 98, 118cm depths. We are hopeful this information might provide further insight into the drivers behind yield variation between the two seeding systems. There is a noticeable difference between the tyne, 155.42 and the disc, 142.7 smu's on the 26 March 2012. This difference may be a result of several factors;

1. Variability of soil type where each probe was installed (likely). Soil variability has a direct effect on the plant available water capacity of a soil profile. Eg. Heavy clay compared to sandy loam. These probes are only 22m apart in what appears to be a relatively even paddock but this would not completely discount the possibility of variation between each probe.
2. Better moisture infiltration rates in tyne site from more aggressive soil disturbance (possible). From the graph it appears that the spikes in the line, as a result of a rainfall event, are higher for the disc system probe. (See circled areas in the graph) This indicates increased infiltration at the disc probe and so contradicts improved infiltration for the tyne system.
3. Greater root development in disc system or conversely decreased root development in the tyne system (unlikely). Tony Lehmann has observed that crops established with the disc seeder hang on for a longer period than those established with the tyne system. The reduced early dry matter of the disc system would more than likely reduce root biomass so this is a point of conjecture. It may be that the lower disturbance of the disc system has a positive effect on soil properties and this could increase root development potential. This is supported by the probe graph area circled by the large green circle. The disc probe is still drawing down steeply while the tyne probe has started to flatten out indicating the crop is no longer pulling moisture from the profile.

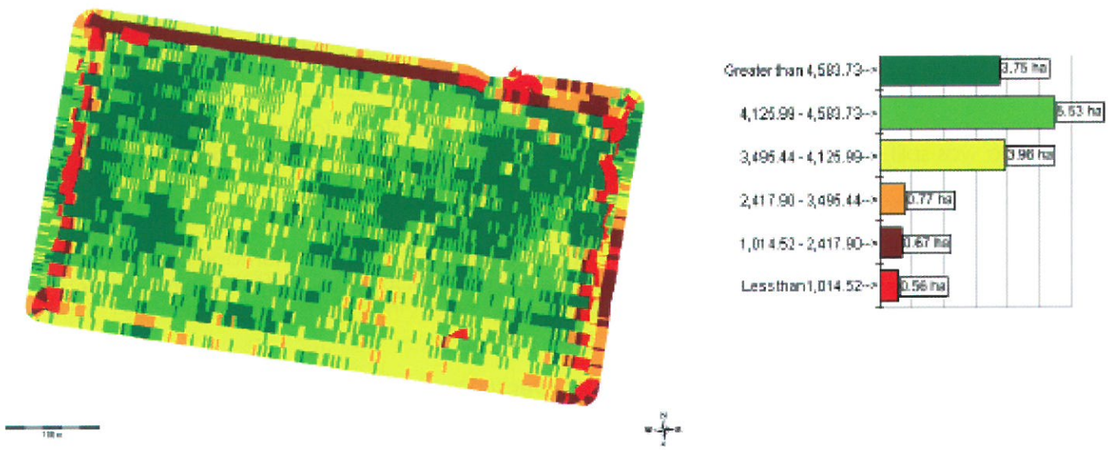


Figure 4: Yield map Illabo Disc vs Tyne 2012 (Map has not been cleaned, raw data only.)

Acknowledgements:

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Monitoring: Paul Breust, FarmLink Research Ltd