



Disc vs Tyne Seeder Illabo Demonstration 2013

2013 Demonstration Site



Project Partners

Tony Lehmann, Hillside

Moloney Family



Disc vs Tyne Seeder Demonstration 2013

Preamble

The FarmLink site on Tony Lehmann's Hillside property, Illabo has just completed its sixth year in succession. ABC rural program Landline recently featured this site in one of their programs. The paddock is split equally between the two treatments. Each treatment has been re-sown each year using the same seeder. In 2012 and 2013 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 2013 favoured the tyne seeder by 0.35t/ha. It is suspected that frost may have reduced yields in the disc area slightly due to a slightly lower elevation. This trend has not been identified in the previous years of the demonstration. Long term average yields show that the disc seeder is marginally ahead of the tyned seeder.

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. (refer 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 SA 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 following, 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 2008-2013. Measurements have been collected on establishment, NDVI, tillers, heads, grain yield, grain quality and weed densities

Seeders

John Deere single disc opener on 250mm spacing. Disc is 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.



Figure 1: Tyne vs Disc sown areas, 2013.

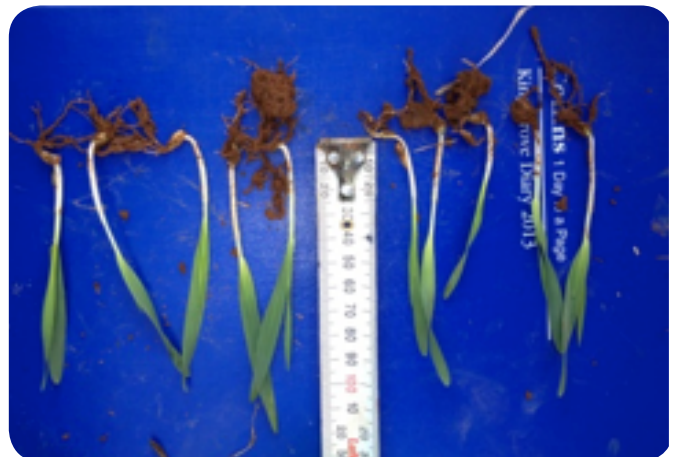


Figure 2: Disc seeding depth, 2013.

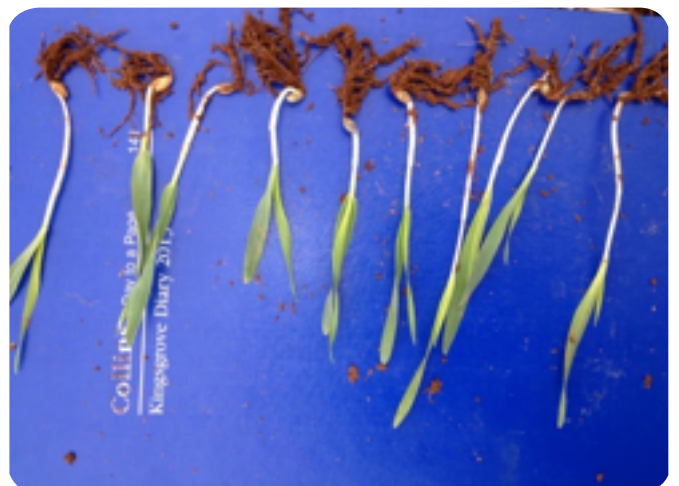


Figure 3: Tyne seeding depth, 2013.

Figures 1-3 show the minimum stubble and soil disturbance of the JD disc seeding system compared to the flexi-coil tyne and press wheel system. They also show the evenness of seeding depth for the JD disc at 30-35mm and the less even depth of the flexi-coil tyne machine. Other tyned seeders can reduce variability of seeding depth.

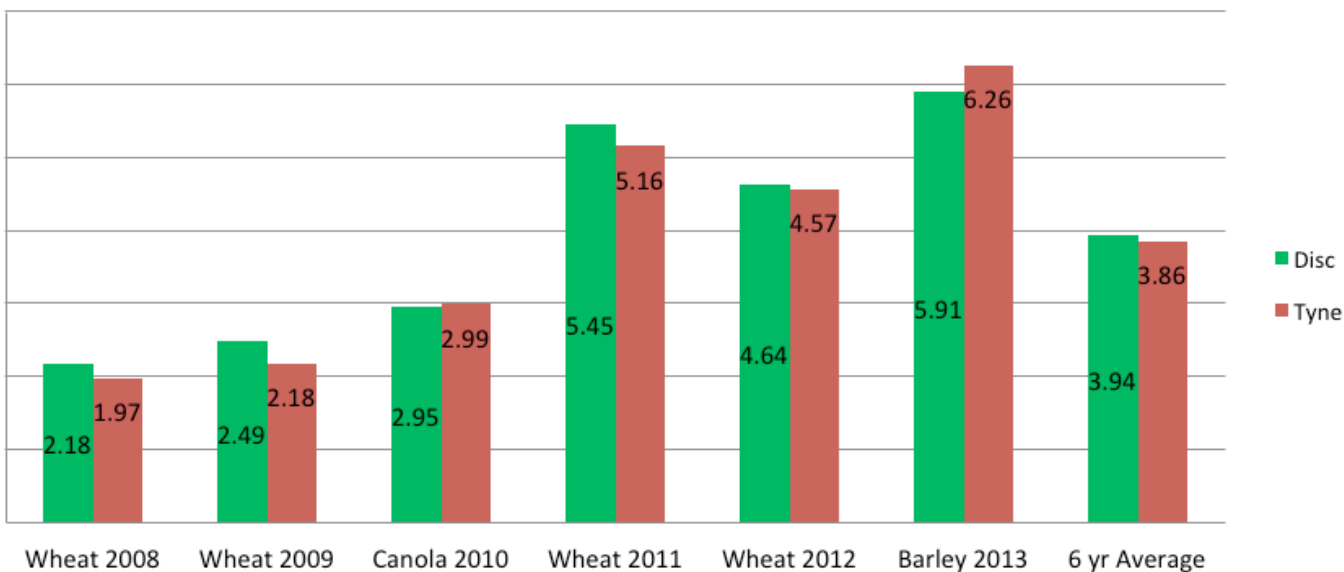
Table 1: Site details Illabo Disc vs Tyne, 2012.

Pre-sowing	Gramoxone + Dual gold + Sencor
Sowing	2/5/13 Hindmarsh Barley 40kg/ha + Zn, Dividend, Emerge 80kg/ha MAP
Post sowing	750mls MCPA Lve, 5gms Ally, 50ml Brodal, 200ml Lontrel, 250ml Tilt, 200ml Axial, 0.5% Agidor
Top Dressing	10/6/12 + Urea 120kg
Harvest	22/11/13
Rainfall	296 mm GSR, 278mm 1st Nov 12 – 31st March13 = 319 PAW

Table 2. Site results Illabo Disc vs Tyne, 2012.

Seeding Implement	Disc	Tyne
Emergence	108 plants/m ²	91 plants/m ²
Yield*	5.91 t/ha	6.26 t/ha
WUE	18.5 kg/mm	19.6 kg/mm

* Yield kg/ha / GSR – 60mm + 30% summer and autumn rainfall = 319mm



Graph 1: Disc vs Tyne Illabo yields 2008 -2013.

Discussion

In 2013 there was a 0.35t/ha difference in yields between the disc and tyne seeders with the tyne seeder performing 5% better. It is suspected that frost may have reduced yields in the disc area slightly due to a slightly lower elevation. This trend has not been identified in previous years of the demonstrations.

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).

The co-operator has in the past observed reduced vigour from the disc seeding system and has reacted to this by bringing his sowing dates forward accordingly. Lower early vigour can result in improved harvest index. That is the plants produce a higher percentage of grain as opposed to dry matter. NDVI scanning in 2012 confirmed a significant difference in early dry matter in the tyne site for wheat.

In 2008 and 2009, which were below average rainfall years, the JD disc seeding system has performed slightly better than the Flexi-coil tyne and press wheels. 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 rise to greater 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 however.

In the summer of 2009-10 there were a greater numbers of hairy panic and goose foot, in the tyne seeded area. Weeds were treated early and would have had minimal impact on soil N and moisture levels. The tyne system contained greater numbers of hairy panic in 2010/11 and 2011/12 over summer. (data not presented) Under Canola in 2010 both systems yielded equally. 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 minor.

Yields in wheat in 2011 were similar with both systems recording over 5T/ha. To collect yield information each seeder area was split into 2 separate blocks of 0.5 and 1ha size. These were harvested & 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 @ 5.45t/ha compared to Tyne @ 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).

Average yields for JD disc over the six years is 3.94T/ha compared to the tyne at 3.86T/ha. (See graph 1).

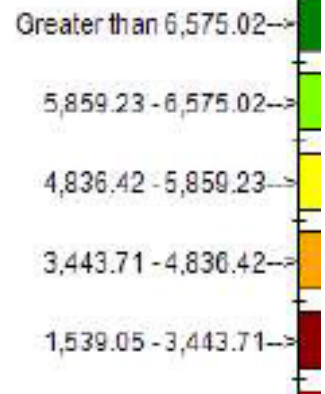
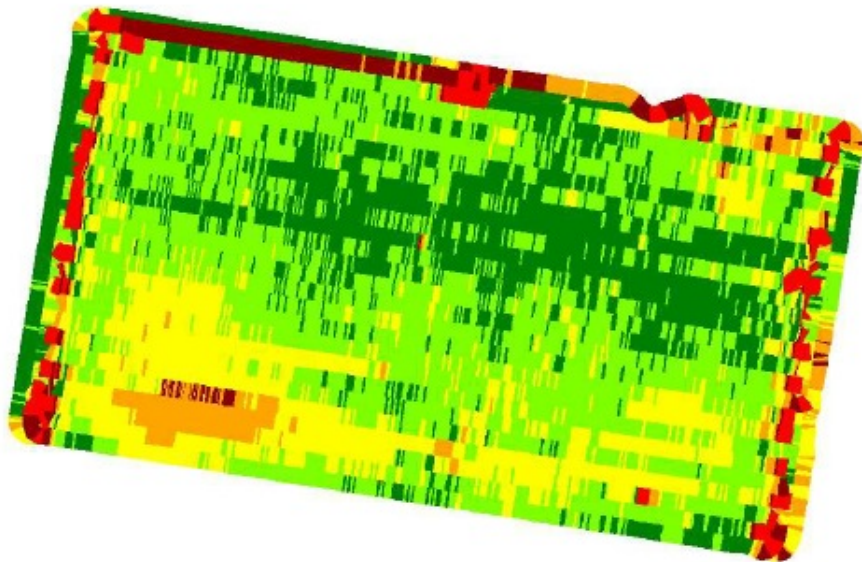


Figure 4: Yield map Illabo Disc vs Tyne 2013 (Map has not been cleaned, raw data only.)

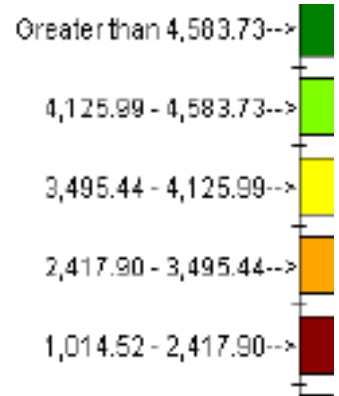
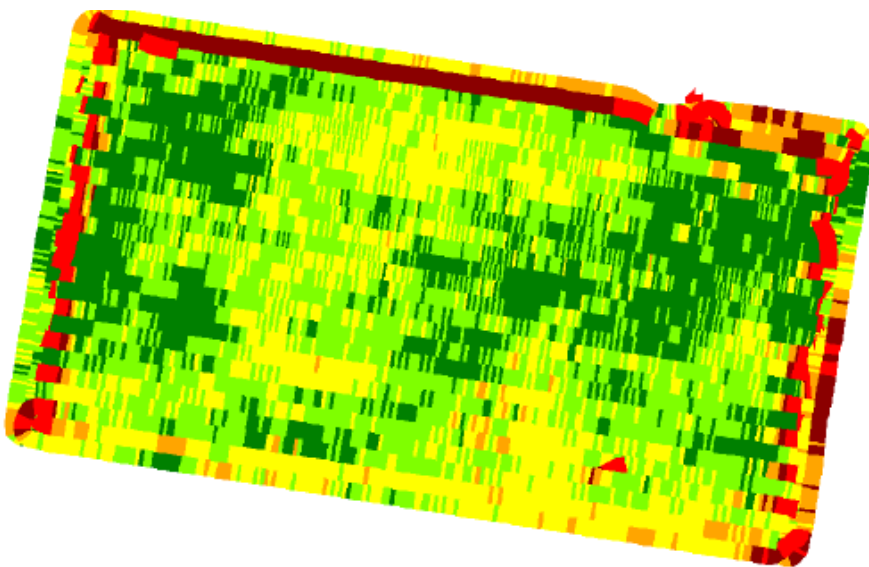


Figure 5: Yield map Illabo Disc vs Tyne 2012 (Map has not been cleaned, raw data only.)

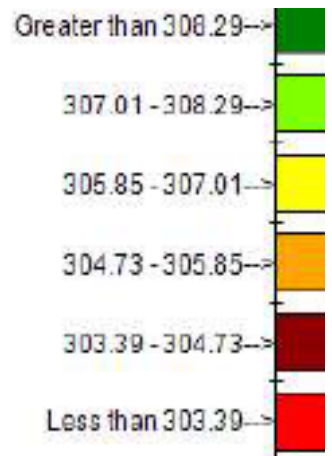
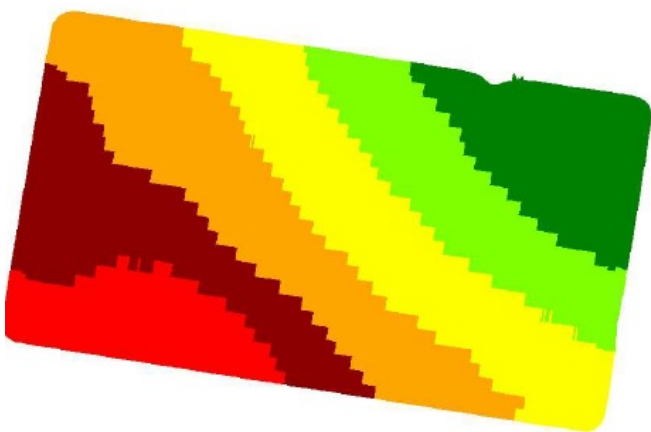


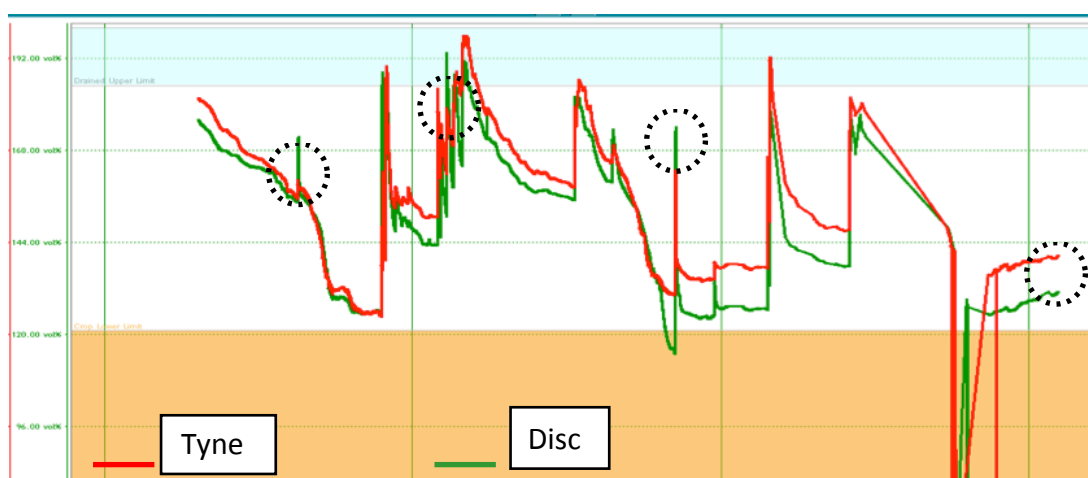
Figure 6: Elevation map Illabo Disc vs Tyne.

Moisture Probes

A paired set of moisture probes were installed at the Illabo D v T site to measure soil moisture levels during the season. Measurements were recorded at 22, 32, 52, 72, 92, 112cm depths.

There is a noticeable difference between the tyne, 140 and the disc, 130 smu's on 13th Feb 2013. This difference may be a result of several factors the most likely is there is slight variation between soil characteristics at each probe site which changes the crop upper and lower limits. When each separate sensor is inspected the disc site is consistently lower in the 52cm and 72cm ranges. This is clear on the sum sensor graphs at the end of 2012 and the difference has been carried forward into 2014. (Note the data in the area from mid 2013 to late 2013 has not been collected due to transmission failure.)

The probes are reliable indicators of soil profile PAW available at any time of the season. They provide valuable information when considering crop planning and N applications. The identified differences between to two seeders PAW profile raises questions as to why it exists. This might be a good focus for further investigation into root depth, DM and soil parameters for these seeding systems.



Graph 2: Disc vs Tyne Illabo soil moisture levels.

Acknowledgements:

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