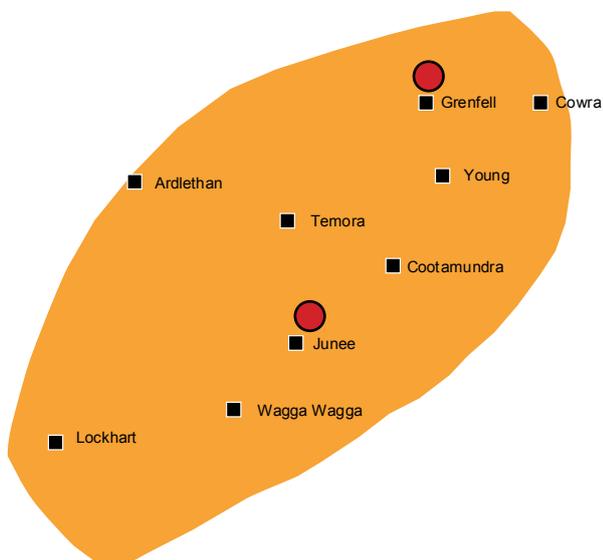




Disc vs Tyne: Paddock scale comparisons

2010 Trial Sites



Project Partners

Illabo



AWL Hillside



Grenfell

Weddin Landcare Group

Lachlan Fertilizers Rural



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Disc vs Tyne Seeder Demonstrations 2010

Project collaborators

Illabo site - FarmLink Research, Tony Lehmann Hillside, Moloney Family, Grassroots Agronomy.

Grenfell site – Lachlan CMA, Weddin Landcare, Lachlan Rural Fertilizers, Rob Johnson, Duncan Lander.

Preamble

The disc vs tyne demonstration sites continue to attract the interest of growers. 2011 provided the first year of moist sowing and growing conditions at Illabo and Grenfell. A wet year would allow the first comparison of both seeding systems suitability under those conditions. It has been suggested that disc systems might struggle in wet soils because of smearing, hair pinning, herbicide efficacy and crop safety. (See report on 'Herbicide Efficacy in no-till systems', Grassroots Agronomy).

Final yield results for 2010 at both sites were not significantly different between both seeding systems. The grazed treatment at Grenfell increased yields by between 11% and 18%. 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.

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

Method

Two paddock scale areas were sown at Illabo and Grenfell with areas split between disc and tyne seeders. Areas were sown by same seeders in 2008, 2009 and 2010. The Grenfell site had three replications of each seeder which was split in half to compare grazed and ungrazed treatments.

Illabo

John Deere single disc opener on 305 mm 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 225mm spacing. Knife points and press wheels.

Grenfell

Daybreak single disc opener on 380mm spacings. Sown at 16km/hr with 335HP tractor.

Horwood Bagshaw tyne seeder on 350mm spacings, knife points and press wheels. Sown at 9km/hr with 305HP tractor.



Figure 1: Moloney Flexi-coil bar



Figure 2: Lehmann JD Disc seeder



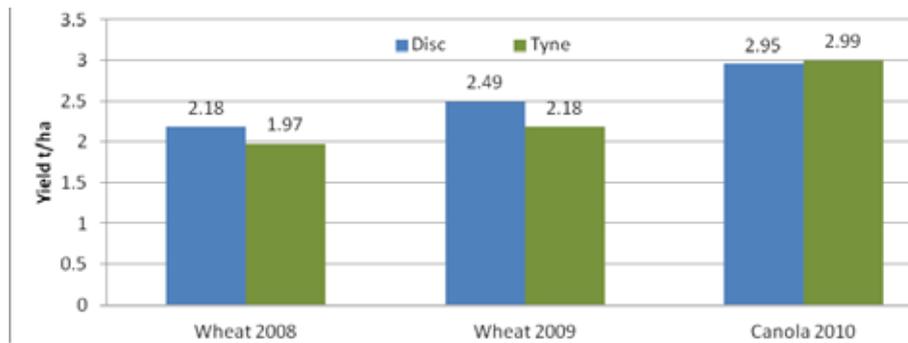
Figure 3: Disc (lhs) area post sowing compared to Tyne area (rhs)

Table 1: Site details Illabo and Grenfell disc vs tyne, 2011.

	Illabo	Grenfell
Paddock preparation	7/1/10 - Glyphosate 1.25 L/ha, Ester 500 ml/ha, Garlon 80 ml/ha. 26/2/10 – Glyphosate 1.25 L/ha	Dec 2010 – Kenup Dry 830g/ha, Garlon 80ml/ha (Ungrazed areas required two fallow sprays).
Pre-sowing	Glyphosate 1 L/ha	14/5/10 Kenup Dry 830g/ha, Ester 600ml/ha, Striker 100ml/ha
Sowing	Jardee canola sown 30/4/10 2 kg/ha 50 kg/ha MAP + 300 gm/ha Triadimefon	Tawriffic canola sown 17/5/10 2.5 kg/ha 80 kg MAP + 400 ml/ha Impact in furrow
Post sowing	19/5/10 – 2.2kg Atrazine, 500 mls Lorsban 12/7/10 – 1.1 kg Atrazine, 300 mls Select, 35 mls Verdict	Atrazine 900 - 2.2 kg/ha Select 250ml/ha, Dimethoate 85ml/ha, Hasten 500ml/ha
Harvest	7/12/10	
Rainfall	431 mm GSR	

Table 2. Site results Illabo and Grenfell disc vs tyne, 2011.

	Illabo - FarmLink		Grenfell – Lachlan Rural Fertilizers	
Sowing system	Disc	Tyne	Disc	Tyne
Fuel	4.4 L/ha	4.7 L/ha	3.2 L/ha	4.2 L/ha
Emergence	40.7 plants/m ²	42 plants/m ²	Grazed: 23 plts/m ²	Grazed: 21 plts/m ²
			Ungrazed: 26 plts/m ²	Ungrazed: 22 plts/m ²
Yield	2.93 t/ha	2.99 t/ha	Grazed: 1.57 t/ha	Grazed: 1.57 t/ha
			Ungrazed: 1.39t/ha	Ungrazed: 1.29t/ha
WUE	6.03 kg/mm	6.14 kg/mm	Grazed: kg/mm	Grazed: kg/mm
			Ungrazed: kg/mm	Ungrazed: kg/mm



Graph 1: Disc vs tyne Illabo yields 2008 -2010

Discussion

Below average rainfall Over 2008 and 2009, which were below average rainfall years, the JD disc seeding system has performed well in comparison to the Flexi-coil tyne & press wheel at Illabo. This may be a result from lower soil disturbance in the zero till disc seeder retaining slightly higher soil moisture? Another factor could be that 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 & 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 treated area. Weeds were treated early and would have had minimal impact on soil N & 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 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 minor. A paired set of moisture probes have been installed at the Illabo D v T site to measure soil moisture levels in the 2011 growing season. Measurements will be recorded at 28, 38, 58, 78, 98, 118cm depths. We are hopeful this information will provide further insight into the drivers behind yield variation between the two seeding systems. The site will be sowed to wheat in 2011 and we will continue to monitor it closely to determine if there are any compounding long term effects as a result of using either system.

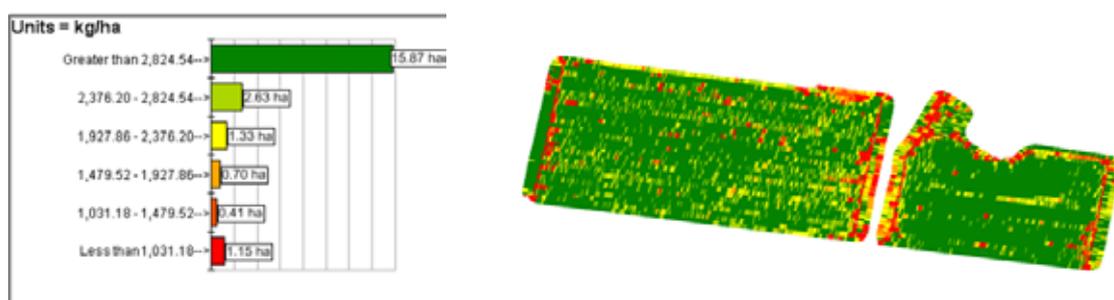
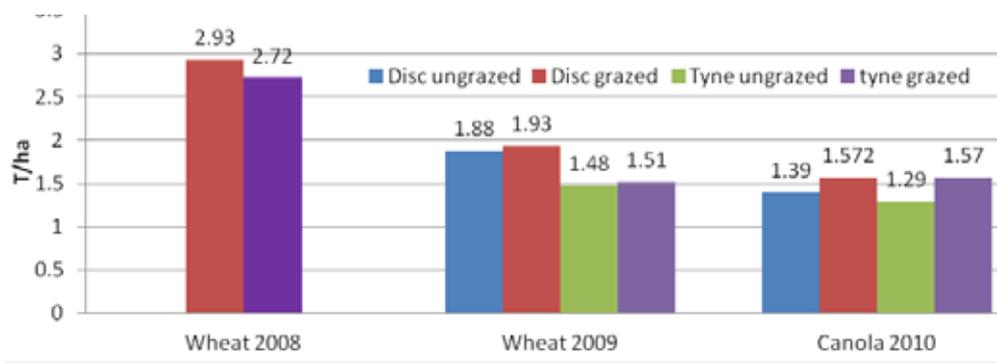


Figure 4: Yield map Illabo disc vs tyne, 2010 (Map has not been 'cleaned' - raw data only)



Graph 2: Disc vs tyne, grazed v ungrazed Grenfell yields 2008 - 2010

Discussion

The Grenfell site has the added benefit of the replication of each seeding treatment, plus an extra treatment of grazed v ungrazed during the summer fallow period. The stubble grazed treatments have out yielded the stubble retained treatments in 2009 & 2010. Similar to Illabo, the Grenfell site has seen the disc seeding system out yield the tyne system in the 2 years of below average rainfalls. Also similarly to Illabo in 2010 under Canola, yields were equal between both systems.

Lachlan Caldwell, Lachlan Rural Fertilizers Grenfell, has managed the monitoring program at this site. He has indicated similar reasons for the ability of the disc seeding system to out yield the tyne seeding system. He has prophesied that higher and earlier rates of N mineralisation in the grazed treatments have resulted in higher yield for that treatment.

The data from this site should be considered carefully as following 2008 there were high pre sowing numbers of Patterson's Curse recorded in the tyne treatment, 40plants/m² v 17plants/m². These weeds were sprayed later than ideal and would have had a detrimental effect on soil moisture and N levels in following seasons. The higher weed infestation numbers indicate the impact of greater soil disturbance from tyne systems. Interestingly the grazed sites also recorded marked differences in weed density, grazed disc at 33plant/m², grazed Tyne at 113/m². (see table 3)

Another interesting observation is that where weed numbers were similar between seeders, i.e. Disc grazed v Tyne nil graze, the yields of the tyne system were 26% lower than the disc.

2009	Daybreak disc		Horwood Bagshaw Tyne	
Treatment	Grazed	Nil Graze	Grazed	Nil Graze
Pattersons curse plants/m²	33	17	113	40
% increase over disc nil graze	94	0	570	135
Yields 2009	1934	1882	1519	1418

Conclusions

Both sites are planned to continue long term to determine if there are any compounding benefits or drawbacks as a results of using each system. Growers are reminded that seed placement is just part of the system of crop production and all factors should be considered when considering which system to adopt. Results from the Illabo site are paddock scale measurements and have no statistical significance. Having said that it appears that the disc seeding system has a yield advantage over the tyne in years of yield limiting rainfall.

Acknowledgements

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