

SFS Seeder Demonstration 2015

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Southern Farming Systems (SFS)

KEY MESSAGES

- There was significant variation for many of the parameters measured between seeders
- Lowest variation was for disc and tyne parallelogram setups – JD disc, Boss, Equalizer
- Discs were more consistent for seed depth
- Seeder setup, operation and monitoring is critical to success
- Low NDVI areas were the highest yielding
- The selection, setting up, monitoring and operating of seeders is vital in capitalising on machine design features

INTRODUCTION

Local growers and seeder manufacturers were invited to participate in a demonstration of their seeders. There were 15 different seeders, 7 disc and 8 tyne and press wheel, demonstrated on the day. The operators and company representatives described the advantages and disadvantages of their machines. SFS members and the public were able to ask questions on specific areas that interested them. SFS monitored each seeder strip during the growing season for establishment, seed depth, normalised difference vegetative index (NDVI), dry matter (DM) production, weeds, disease, tiller counts, head counts and yield. The results of this monitoring are presented in this article.

The seeder day was held on June 19, and 80 kg/ha Westminster barley was sown into sandy loam over clay with ideal seed bed moisture and 70 kg/ha MAP, with a knockdown pre-sowing and Boxer Gold IBS. Target plant numbers were 185/m² and target seed depth 15 mm.



Figure 1. SFS seeder demo line up



Figure 2. SFS seeder demo line up

RESULTS AND DISCUSSION

Every seeder excluding the Great Plains Precision planter had lower establishment than the target 185 plants/m². Discs on average were lower, (19/m²), than Tyne and press wheel seeders for establishment. There was a surprisingly wide range of variation in plant numbers/m² for most seeders. It is unclear as to why this was the case.

Seed depth target was 15 mm in moist seed bed conditions. Most seeders placed seed below the 15 mm target depth. The range of variation for discs was lower than the variation for tyne and press wheel seeders at this site as detailed in table 1. The design features on disc seeders as a general rule limit vertical movement during the sowing operation in comparison to tynes.

Table 1. Plant establishment and seed depth SFS seeder demo 2015. Seeders have been recorded in sowing order starting from the north east corner of the paddock, as per the NDVI in figure 3.

Seeder type	Seeder	Spacing (mm)	Plants/m ²		Seed depth (mm)	
			Av/m ²	Varied +/-	Av	Varied +/-
Disc	Cross Slot disc*	0.25	227	78	29.2	8.5
Tyne	Seed Hawk tyne	0.25	159	42	29.1	11.5
Disc	Semeato disc	0.17	165	38	23.5	4.0
Tyne	Horwood Bagshaw tyne	0.25	163	58	26.8	13.0
Disc	Serafin Ultisow disc demo	0.25	128	64	38.3	18.0
Tyne	Flexicoil 12m tyne	0.25	166	76	28.7	19.0
Disc	John Deere 1890 disc + liquid	0.25	142	28	17.8	11.0
Tyne	Boss tyne	0.25	143	38	17.2	7.0
Disc	Vaderstad Rapid disc	0.12	176	46	30.6	16.5
Tyne	John Deere 735 tyne	0.19	153	45	37.6	27.5
Disc	John Deere disc 1890 no liquid	0.25	148	44	20.3	11.0
Tyne	Flexicoil 15m tyne	0.25	159	44	38.8	21.5
Disc	Great Plains Precision disc planter	0.37	185	10	25.6	14.0
Disc	Amazone Cirrus 60032 disc	0.125	166	48	15.7	8.5
Tyne	Equalizer - South African tyne	0.30	160	16	19.8	5.0
Tyne	Horwood Bagshaw Knuckey tyne	0.30	161	26	25.0	12.5
Disc average			139.0	39.0	25.0	11.0
Tyne average			158.0	43.0	27.0	14.0

*Cross slot over-sowed it's first run, hence the high plant counts. It did not sow all eight strips allocated to it so was excluded from calculations.

NDVI

There was minimal difference between seeders and implement type for NDVI. NDVI is a good indicator of crop DM up until the canopy closes. A couple of machines established poorly and this was visibly clear on the NDVI maps (see figures 4 and 5). The Amazone disc left seed on the surface and plants lacked early vigour. The Great Plains precision disc planter had wide row spaces and the Cross Slot seeder was incorrectly calibrated and sowed only 2 of the 8 strips allocated to it. This was subsequently resown using the SFS trial seeder and information not considered for calculating averages. NDVI images were collected by Martin Peters of FarmingIT using an unmanned aerial vehicle (UAV) which demonstrated the variation of crop growth between seeders on July 23 and August 31, 2015 (see table 2).

Table 2. NDVI for each seeder July 23 and August 31.

Seeder type	Seeder	NDVI July 23	NDVI August 31	Difference
Tyne	Seed Hawk	0.22	0.42	0.20
Disc	Semeato disc	0.21	0.43	0.22
Tyne	Horwood Bagshaw	0.21	0.41	0.20
Disc	Serafin Ultisow disc demo	0.19	0.38	0.19
Tyne	Flexicoil 12 m	0.22	0.43	0.21
Disc	John Deere 1890 + liquid	0.20	0.43	0.23
Tyne	Boss	0.21	0.42	0.21
Disc	Vaderstad Rapid disc	0.21	0.41	0.20
Tyne	John Deere 735 (19 cm)	0.22	0.42	0.20
Disc	John Deere disc 1890 no liquid	0.20	0.42	0.22
Tyne	Flexicoil 15 m	0.19	0.41	0.22
Disc	Great Plains Precision planter	0.17	0.37	0.20
Disc	Amazone Cirrus 60032 disc	0.16	0.37	0.21
Tyne	Equalizer - South African seeder	0.18	0.42	0.24
Tyne	Horwood Bagshaw	0.18	0.41	0.23
Disc average		0.19	0.40	0.21
Tyne average		0.20	0.42	0.22

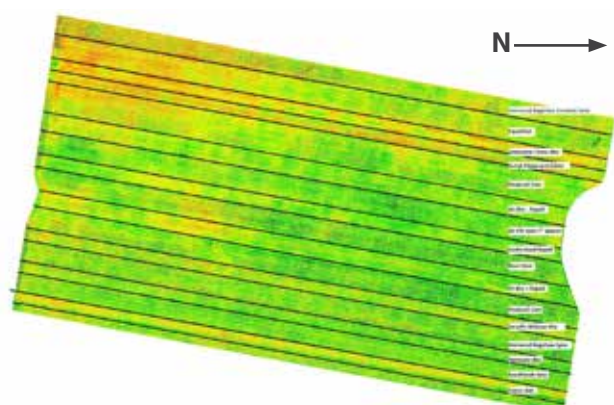


Figure 3. NDVI map SFS seeder demo July 23. (Strips in same order as the tables from the bottom up. Cross Slot bottom right hand side)

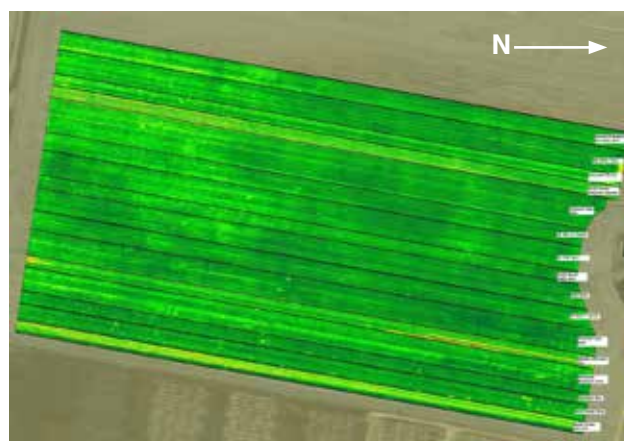


Figure 4. NDVI map SFS seeder demo August 31. (Strips in same order as the tables from the bottom up. Cross Slot bottom right hand side)

DM matter

The biomass accumulated by the crop flowering is valuable in helping determine potential yield of the crop prior to harvest. DM cuts were collected using a forage harvester with cuts measuring 10 m x 1.45 m, one per strip. Discs on average were 0.64 t/ha lower in DM.

As a general rule, seeders with lower early NDVI have less dry matter at this stage, in this demonstration examples included the Serafin disc, Great Plains and Amazone. DMs ranged from 6.46 t/ha (Great Plains precision planter) to 11.87 t/ha (Semeato disc) which is an unexpectedly large variation given the fairly even NDVIs (figure 4).

Table 3. Dry matter for each strip t/ha November 19.

Seeder type	Seeder	Width m	DM t/ha
Tyne	Seed Hawk	12	11.37
Disc	Semeato disc	3.0	11.87
Tyne	Horwood Bagshaw	12.0	8.72
Disc	Serafin Ultisow disc demo	2.0	7.80
Tyne	Flexicoil 12m	12.0	9.07
Disc	John Deere 1890 + liquid	9.0	7.87
Tyne	Boss	12.0	8.12
Disc	Vaderstad Rapid disc	3.0	8.41
Tyne	John Deere 735 (19cm)	12.0	9.03
Disc	John Deere disc 1890 no liquid	9.0	8.43
Tyne	Flexicoil 15m	15.0	7.35
Disc	Great Plains Precision planter disc	3.0	6.46
Disc	Amazone Cirrus 60032 disc	6.0	8.98
Tyne	Equalizer - South African seeder	12.0	9.52
Tyne	Horwood Bagshaw	9.0	10.32
	Disc average		8.55
	Tyne average		9.19

Annual ryegrass (ARG) establishment

Anecdotally, the lower soil disturbance of the disc seeders is thought to hinder ARG establishment compared to the more vigorous disturbance of a tyne and press wheel system. The counts were collected from 10 m x 10 m paired plots adjacent to each other in the JD disc and Boss tyne seeder strips. This information supported the anecdotal evidence but more work is required to establish a statistical difference.

Table 5. ARG counts to compare disc seeders with tyne for ARG emergence. Averages of 10 m x 10 m paired plots.

ARG/m ²		
Boss	JD Disc	Diff/m ²
1.19	0.37	0.82

Yield

The paddock used had some variability related to soil type and elevation (see figures 4 and 5). Due to this it was decided to split the paddock into two blocks for the purposes of yield assessment. The north block was considered the most consistent and yield information is based on this area. The south-west corner was used for trials in 2014 and yield information in that area for the Equalizer and Horwood Bagshaw Knuckey tyne strips should not be considered. That said it is interesting that this area yielded the highest of any in the paddock regardless of being lower for NDVI at the times of measurement.

Table 6. SFS seeder demo data point yields from harvester yield monitor 2015.

Seeder	North yields t/ha
Seed Hawk	1.32
Semeato disc	1.05
Horwood Bagshaw	1.23
Serafin Ultisow disc demo	1.42
Flexicoil 12m	1.32
John Deere 1890 + liquid	1.76
Boss	1.58
Vaderstad Rapid disc	1.15
John Deere 735 (19cm)	1.68
John Deere disc 1890 no liquid	1.57
Flexicoil 15m	1.59
Great Plains precision planter disc	1.30
Amazone Cirrus 60032 disc	1.46
Equalizer - South African seeder	1.56
Horwood Bagshaw	1.79
Disc average	1.39
Tyne average	1.51

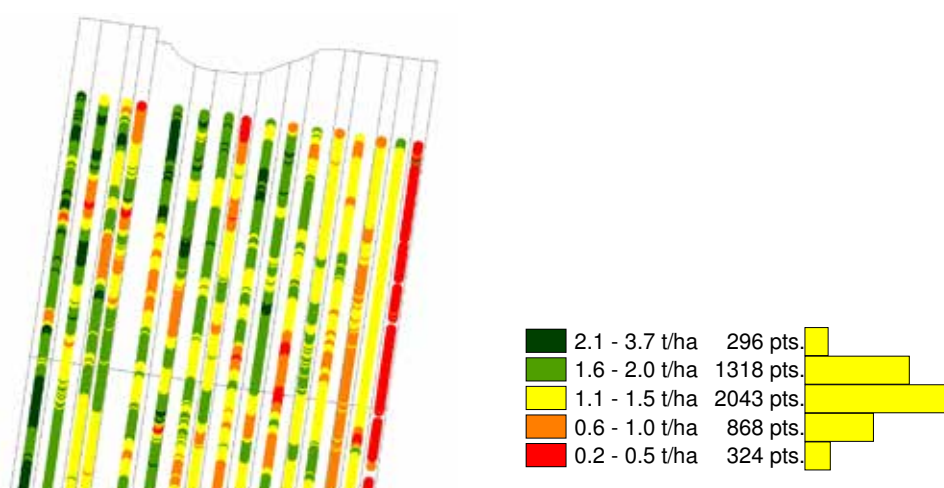


Figure 5. Harvester monitor yield map and legend north area, SFS seeder demo 2015.

Yields were much lower than regional averages as a result of the late sowing date, June 19 (due to availability of seeders) and decile 1 spring rainfall. Disregarding the resown Cross Slot plot, yields averaged between 0.6 to 3.7 t/ha for the north block, with most data points between 0.6 and 2 t/ha. The seeders with highest readings for NDVI (ie. higher early DM) have recorded generally lower yields. This group includes Seed Hawk, Semeato, Horwood Bagshaw and 12 m Flexicoil.

Conversely seeders with lower early NDVI (ie. lower DM) have recorded above or equal to average yields (except the Great Plains Precision disc which was low NDVI all year and was just below average yields). This was due to increased moisture stress at grain fill for the seeders that had above average NDVI. That is, these seeders used up more moisture early to produce DM. This group includes Serafin Ultisow, 15 m Flexicoil, Amazone, Equalizer and the Horwood Bagshaw Knuckey tyne.

The Boss, JD disc (+/- liquid inject) and the JD 735 tyne all recorded high NDVI and above average yields. The demonstration layout makes it difficult to draw solid conclusions as to the reasons why these seeders performed well.

To more fairly compare commercial discs seeders to commercial tyne seeders we should only consider the similar sized JD 1890. The narrow demonstration disc seeders were all less than 6 m wide and would not provide a realistic comparison. The JD disc has compared well with the other tyne and press wheel machines. The plus liquid inject strip recorded 1.76 t/ha which was near the best yielding strips in the demonstration. The JD disc minus liquid inject yielded 190 kg less than the plus liquid inject. Overall disc seeders on average yielded 120 kg/ha less than tyne seeders.

CONCLUSIONS

While no statistical conclusions can be drawn from the demonstration, it has been a valuable exercise in alerting growers to the range of seeders available and the pros and cons of each in a range of sowing conditions. Growers were able to evaluate and discuss each seeder's potential for use in their system.

The most important information from the day is that a grower's level of expertise in selecting, setting up, monitoring and operating their machine will likely have as much influence as design features. There are differences in seeder capabilities for a wide range of environments.

That said, design is a very important consideration when evaluating seeders for your specific situation. A similar demonstration at Bradvale run by Premier Ag and Meridian Ag found that seeders that provided cultivation below the seed bed were much better suited to the heavier clay soil at that site. So it's horses for courses in many cases. If you are going to bet on one horse in favour of another it is wise to have as much information available as possible before you place the bet. Knowing how that horse performs at a certain track, over a certain distance in conditions similar to your own will definitely help you pick a winner.

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