

December 2000

CROP ESTABLISHMENT TECHNIQUES

- A COMPARISON, *Harvest*
2000

Source: Felix Thorney Agricultural Trust
Stanaway Farm
Otley
Woodbridge
Suffolk

Autumn 1999, Crop Establishment Trials

**Source: Felix Thorney Agricultural Trust
Stanaway Farm
Otley
Woodbridge
Suffolk**

Objective

To compare differing methods of establishing crops, and to ascertain potential cost savings and associated establishment/yield benefits or losses.

Site

Heavy land site of clay based soil.

Crops

- 1) OSR
- 2) 1st wheat
- 3) 2nd wheat

Method

Each crop type was drilled on the same day, in the way it would be drilled in that system. Subsequent crop management aimed to be the same for all system types, but where a specific application or operation would normally be utilised for a specific establishment system, it was carried out and recorded.

All systems utilised the same seed rate, and plant populations were monitored once established. The crops will be harvested by a plot combine, in conjunction with a statistician, who will ensure results are accurate and reliable.

Drills used:

OSR: Vaderstad RD600F
Gaspardo 4m direct drill
Horsch CO4
Simba freeflow (4m)

Wheat: Vaderstad RD600F
Gaspardo 4m direct drill
Horsch CO4
Simba freeflow (4m)
JD 750A (3m)

Crop One: Oilseed Rape

Objective

To compare the performance of direct drilled and Autocast OSR against a traditional plough based method.

Drilling process

Date: 31-08-99
Seedrate: 4kg/ha
Previous crop: Wheat, straw chopped

Systems:

- 1) Autocast, Combine, roll, double press, roll
Slug pellets: 4 applications, total cost £25/ha
- 2) Direct drill, roll, double press, roll
Slug pellets: 4 applications, total cost £25/ha
- 3) Plough/press, double press, double press, drill, roll
Slug pellets: 3 applications, total cost £18.75/ha

Results:

A plant population of 50/m² was considered acceptable.

The plough based system achieved the best establishment, in both plant numbers and uniformity.

All direct drilled plots demonstrate uneven establishment. The crop is considerably stronger and more advanced away from combine wheelings. It is hoped that this will not cause a problem. Overall plant numbers are most acceptable, but it is noted that the disc-based drills have performed slightly better than the tine-based machines. The author considers this to be due to the tine machines inability to follow ground contours.

The Autocast crop demonstrated poor establishment, and additional seed was broadcast on to increase plant numbers, but much has now been ploughed up and re-drilled.

Note: Due to problems with sourcing a plot combine at a suitable, no yield data was produced for the OSR crop.

Crop two: 1st wheat after OSR

Objective:

To compare differing levels of primary cultivation, in the establishment of a crop of wheat.

Drilling process

Date: 13-10-99
Seedrate: 350 seeds/m²
Conditions: Very wet
Previous crop: OSR

All five drills planted a crop of wheat within their part of the field, on the four different plot types.

Plot 1: Plough/press
Plot 2: Disc/press four weeks prior to drilling.
Plot 3: Simba mono pre-drilling
Plot 4: No primary cultivation

NB: There was very heavy rainfall between harvest and drilling (est. 100mm)

Results

All established plant populations were considered acceptable, although not ideal. Average across all machines and systems: 335plants/ m²

Establishment system	Average est. plant pop.
Plough	390
Minimum tillage	362
Simba mono	357
Direct drill	236

The ploughed plots gave the highest establishment percentage.

Minimum tillage and Simba Mono were lower but similar to each other.

Direct drilling was the poorest as expected, and gave far better results with some machines than others. (Please see bar graph)

Machine type	Average est. plant pop.
Vaderstad	366
John Deere	364
Simba Freeflow	352
Gaspardo	342
Horsch CO4	311

The Rapid performed the best over the range of establishment techniques, closely followed by the JD 750A. It was of surprise to the author, how well the Gaspardo and JD performed on ploughed land, given that they have no cultivation capability. It is concluded that they were able to place the seed at the required depth, and the wet nature of the soil, helped them to close the seed slot afterwards, and achieve good soil to seed contact.

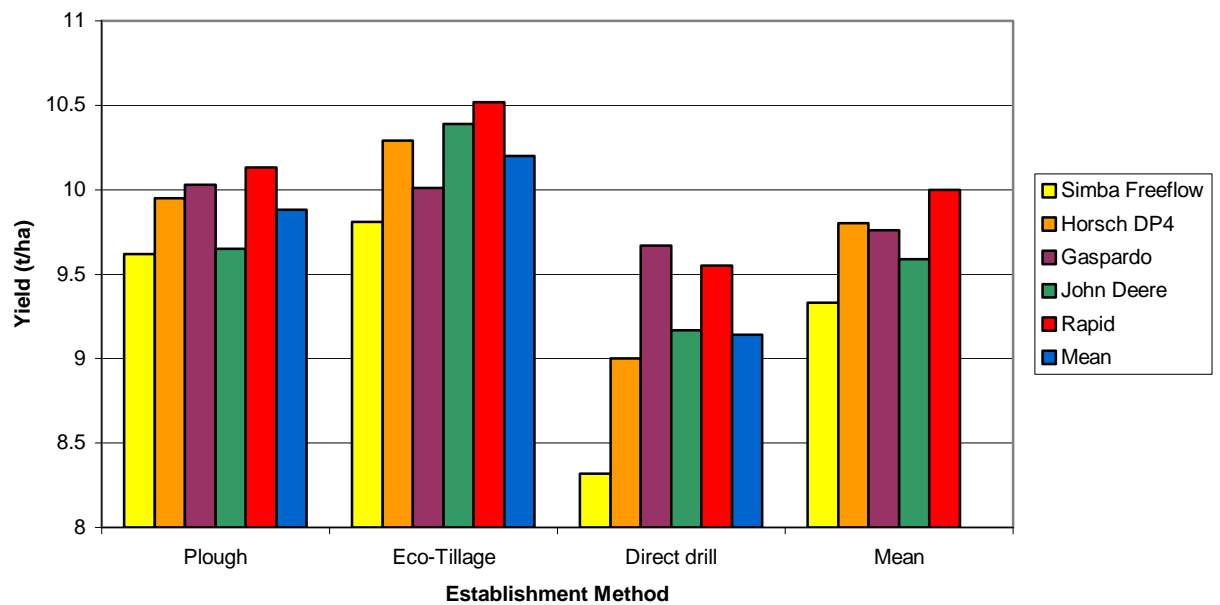
The Rapid was the top performing direct drill.

Yield

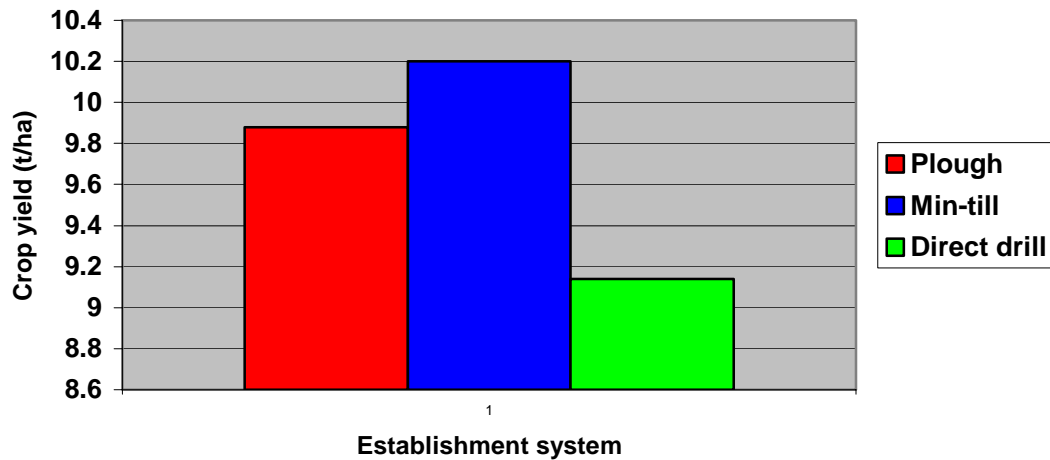
Grain yield (t/ha at 85% dm)

Drill	Cultivation method				Mean
	Plough	Eco-Tillage	Simba Solo	Direct drill	
Simba Freeflow	9.62	9.81	9.58	8.32	9.33
Horsch CO4	9.95	10.29	9.95	9.00	9.80
Gaspardo	10.03	10.01	9.33	9.67	9.76
John Deere	9.65	10.39	9.16	9.17	9.59
Rapid	10.13	10.52	9.78	9.55	10.00
Mean	9.88	10.20	9.56	9.14	

Yields Achieved



First wheat trial results, harvest 2000
Average of All Drills



Crop three: Second Wheat

Objective:

As per first wheat trial.

Drilling process

As per first wheat trial.

Results

All plots drilled gave an acceptable plant population. The average established plant population was lower on the second wheat crop (308 plants/m²), than that of the wheat after OSR (335plants/ m²).

Establishment system	Average est. plant pop.
Plough	350
Minimum tillage	281
Simba mono	309
Direct drill (2 drills only)	270

As before, the ploughed plots gave the best establishment, but may not necessarily give the best financial performance. Minimum tillage and Simba Mono both gave lower plant counts than ploughed.

It is of interest that the average plant count on direct drilled second wheat, is better than that on direct drilled first wheat. However, only two machines managed to drill directly into the wheat stubble. Of the two machines (Vaderstad and JD) that could drill into wheat stubble, they did not achieve such good results in wheat stubble as into rape stubble. Therefore the author concludes that the average

establishment of direct drilled first wheat, would be better if machines are chosen which are most suited to direct drilling (ie. Vaderstad or JD).

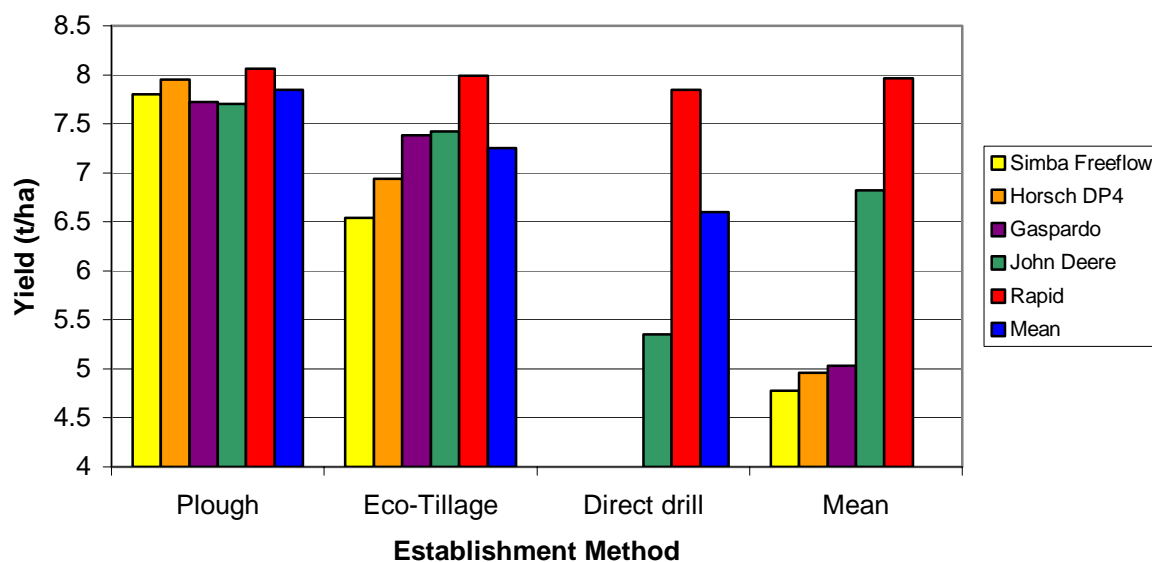
Machine type	Average est. plant pop.
Vaderstad	330
John Deere	310
Simba Freeflow	217
Gaspardo	235
Horsch CO4	222

Only the Vaderstad and the JD were able to direct drill into wheat stubble. This has resulted in poor average figures for the other three drills. **The Vaderstad Rapid was the top performing direct drill.**

Final Crop Yields, 2nd Wheat, Harvest 2000

Drill	Cultivation method				Mean
	Plough	Eco-Tillage	Simba Solo	Direct drill	
Simba Freeflow	7.80	6.54	7.76	0	7.37
Horsch DP4	7.95	6.94	6.25	0	7.05
Gaspardo	7.72	7.38	7.04	0	7.38
John Deere	7.70	7.42	7.00	5.35	6.87
Vaderstad Rapid (System)	8.06	7.99	8.21	7.85	8.03
Mean	7.85	7.25	7.25	6.60	

2nd Wheat Yields, Harvest 2000



Conclusions

The trial demonstrates that a greater degree of primary cultivation generally results in better plant establishment. When harvest arrives we can compare the financial performance to see if it also gives the best returns. The author would expect that some of the other establishment techniques may give a better return, especially if a truly universal drill is utilised.

The results clearly show that the disc drills more consistently give a good establishment than the tine based drills. The author concludes, that in the case of the OSR, this will be due to their ability to follow the ground contours and give an accurate planting depth. The ability to cultivate the ground during OSR drilling does not appear to achieve any better results than drilling with no cultivation (ie Vaderstad vs. Gaspardo).

The tine drills did not perform particularly badly in the first wheat crop, but both struggled in some areas of the second wheat crop. The author suggests this is due to the higher level of surface residues, causing a problem for a tine drill. All disc drills coped with these conditions more easily.

The author concludes it would be advisable to choose a disc based drill where cereals are direct drilled, and for best results in areas of high crop residue, one which can move the soil ahead of the drill coulters, should be utilised. This will ensure that the planted seeds are placed into a mixture of soil and straw, as apposed to being forced into a slot along with surface straw (hair pinning), whereby seed to soil contact is impaired, resulting in poorer germination. Hair pinning does not seem to cause problems, where the soil is moved ahead of the drill coulters

The above suggests that the most universal of all drills tested, is the Vaderstad Rapid. Further tests next year, in other soil types and different weather conditions are due to be carried out to draw more detailed conclusions.