

Vaderstad/ ARC Winter Oilseed Rape establishment trial

Project **Shallow cultivation/broadcast systems for winter oilseed rape establishment**

ARC Region: Southern

Trial Code: HA02-601

Location: Whitfield, Kent (Courtesy Mr S. Beddows)

Variety : Fortis (previously known as Fortress)

Objective

The overall objective is to examine the use of the Vaderstad Carrier to establish winter oilseed rape following shallow cultivation or plough and press.

Specific objectives for the project were

- To look at the influence of seed delivery position on establishment and yield of oilseed rape, when seed is broadcast from different positions on the Carrier cultivator.
- To quantify the degree of cultivation required with the Carrier when used to establish winter oilseed rape.
- To compare the establishment, agronomic requirement, yield and margin of shallow cultivation versus crops broadcast and cultivated in on the plough blocks.
- To examine the importance of the trash rake when using the Carrier as a means of shallow cultivation establishment.

Field situation: Winter oilseed rape following spring barley

Report Summary:

Using the Vaderstad Carrier as a seeding device for winter oilseed rape generated yields between 4.27 - 4.41 t/ha, depending on seed delivery position, number of cultivation passes, and degree of primary cultivation. Using 6 methods of establishment there was no statistical yield difference between any of these treatments, thus the cheapest methods of establishment were the most cost effective i.e. one pass with the Carrier into previous crop stubbles. Despite considerably more competition in the early growth stages from cereal volunteers in the minimal tillage blocks at establishment, there was no advantage to ploughing prior to establishing the rape using the Carrier/Terracast system. As a consequence plough blocks whilst equal highest yielding were least cost effective.

Influence of seed delivery position

Only 2% yield difference covered the 3 positions of seed delivery (not statistically significant) with seed broadcast after the roll position being lowest yielding and showing a drop off in plant population through winter, presumably as a result of poorer anchorage.

Influence of the trash rake

The operation of a trash rake in front of the Carrier/seeder unit gave no benefit in establishment or yield in this experiment.

Influence of two versus one pass with the Carrier

Making 2 passes in the stubble as opposed to one created no significant differences in yield or initial establishment.

Influence of ploughing

Despite a 5-fold decrease in volunteer population with the plough treatments leading to more vigorous establishment and earlier flowering, there was no yield advantage to ploughing over using the Carrier straight into the previous crop stubbles. In the 2003 experimentation the influence of cereal volunteer control in a stale seedbed will be evaluated in the minimal tillage blocks. Though it has not appeared to affect yield in relation to the min till treatments it was noticeable at harvest that there were more prematurely senesced racemes in the plough blocks than the min till blocks.

In conclusion the use of the Carrier to establish oilseed rape straight into the previous crop stubbles gave between £26-34/ha advantage over using the same machine as a seeding device in a ploughed situation.

Trial Methods:

The trial was established on 5th September at 5kg/ha in the conventional variety Fortis. Ground conditions were moist and tilth fine but firm on the ploughed blocks at establishment. The previous crop of spring barley was harvested on the 29th August with the straw chopped and spread. All blocks were sprayed with Glyphosate to control perennial weeds prior to cultivation.

Treatment cultivations:

6 different cultivation blocks were established each replicated 3 times on blocks that were 42m long * 6.5m wide. Of the 42m there was a 10.5m strip that was treated with a pre-emergence herbicide of Katamaran 2.0 l/ha on the 6th September. The remainder of the trial was left unsprayed with herbicide at the pre emergence timing. This strip allowed an assessment of herbicide safety since the sowing depth in many of the treatments was less than the Katamaran label recommendation of 15mm. The treatment cultivation blocks experimented upon were as follows

Trt no.	Method of oilseed rape establishment	Approx cost £/ha
1.	Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	£15
2.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered before the discs.	£15
3.	Vaderstad Carrier with trash rake (two passes) – seed applied with Terracast delivered before the discs on the second pass.	£30
4.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after the discs.	£15

5.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after carrier roll.	£15
6.	Plough and press- Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	(35 +15) = 50

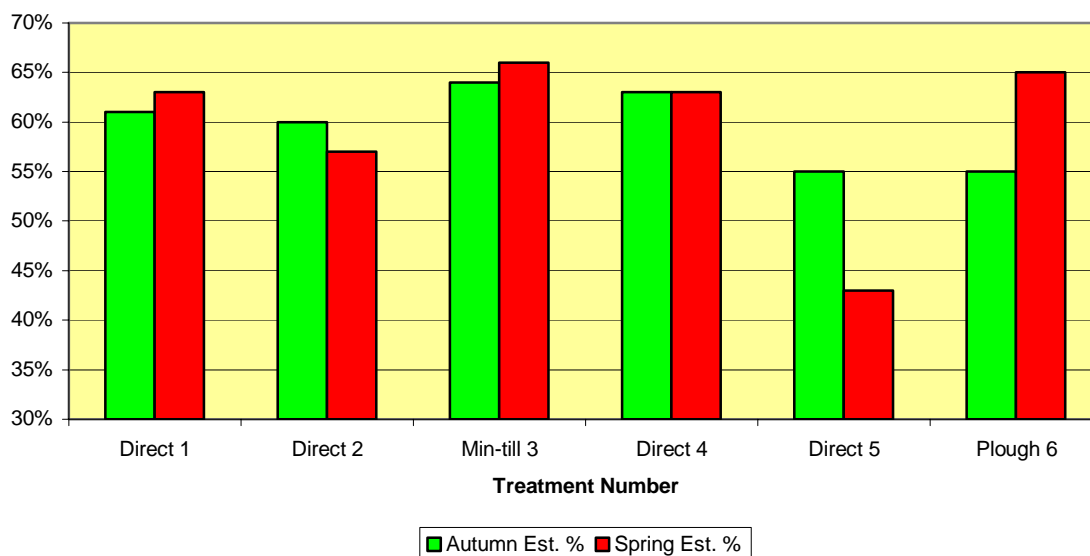
All blocks were rolled following establishment at a cost £10/ha.

i) Establishment (assessed 30th October and 3rd April)

All blocks were sown at 120 seeds/m²

Trt no.	Method of oilseed rape establishment	% Autumn Establishment		% Spring Establishment	
		Plants/ m ²	% Est.	Plants/ m ²	% Est.
1.	Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	74	61.7	75.6	63
2.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered before the discs.	72	60	68.4	57
3.	Vaderstad Carrier with trash rake (two passes) – seed applied with Terracast delivered before the discs on the second pass.	77	64.2	79.6	66.3
4.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after the discs.	76	63.3	75.2	62.7
5.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after carrier roll.	66	55	51.6	43
6.	Plough and press- Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	66	55	78.4	65.3

OSR Establishment Rate in Vaderstad Carrier Drilling Trials Autumn 2001



In terms of establishment, there were few differences between treatments, with little indication that establishment was higher on the plough blocks. There was only a slight improvement in establishment associated with a second pass of the Carrier before seeding. The trial recorded no advantage to the operation of the trash rake in front of the Carrier. The most significant result was associated with the seed delivery position on the Carrier which illustrated as might be expected that seed delivered after the final roll gave the lowest levels of establishment and over winter survival. This latter point is interesting since all treatments show approximately the same establishment levels pre and post winter whereas seed delivered after the roll gave a declining plant population between autumn and spring.

The greatest visual differences at establishment were due to the Volunteer spring barley competition, which considerably reduced the early crop vigour in the minimally tilled plots. The reason for this was that there was insufficient time for destroying volunteer barley in a stale seedbed (Spring Barley harvested 29th August, OSR sown 5th September). Where the rape was established following ploughing the volunteer population was considerably reduced.

ii) Spring Barley Volunteer Population (assessed 29th September, 2 days after sprayed off with 0.2 l/ha Falcon)

Plough treatment	113 plants/m ²
Minimally tilled blocks	834 plants/m ²

Thus from emergence until early October treatments established with the Carrier straight into the stubbles had to compete with 5 times the volunteer population. If earlier barley harvest allowed stale seedbed preparation than destruction of volunteers pre sowing would be more feasible (a component of the 2002/2003 trial). There was no difference in volunteer population between the different minimal tillage treatments.

iii) Slug damage

There was no difference in slug damage between the blocks in this experiment, despite smaller less vigorous plants in the min till treatments. It is envisaged that in a commercial situation rape established with the Carrier without a stale seedbed might potentially lead to problems.

iv) Herbicide Observations

The herbicide Metazachlor has a seed sowing depth requirement of 15 mm. Since broadcast seed from the Carrier has variable depth it was decided to run a 10m strip of the trial with Katamaran at 2.0l/ha which applies 750g/ha Metazachlor. In this experiment no reduction in establishment was observed in any of the treatments where Katamaran was used. This result needs to be applied with caution since there is no doubt that some seed (particularly where broadcast after the cultivating part of the machine) will not have adequate seed coverage. Currently ARC observations suggest that the most likely scenario for damage connected to inadequate seed coverage is when spraying pre em I followed by very heavy rain.

v) Start of Flowering

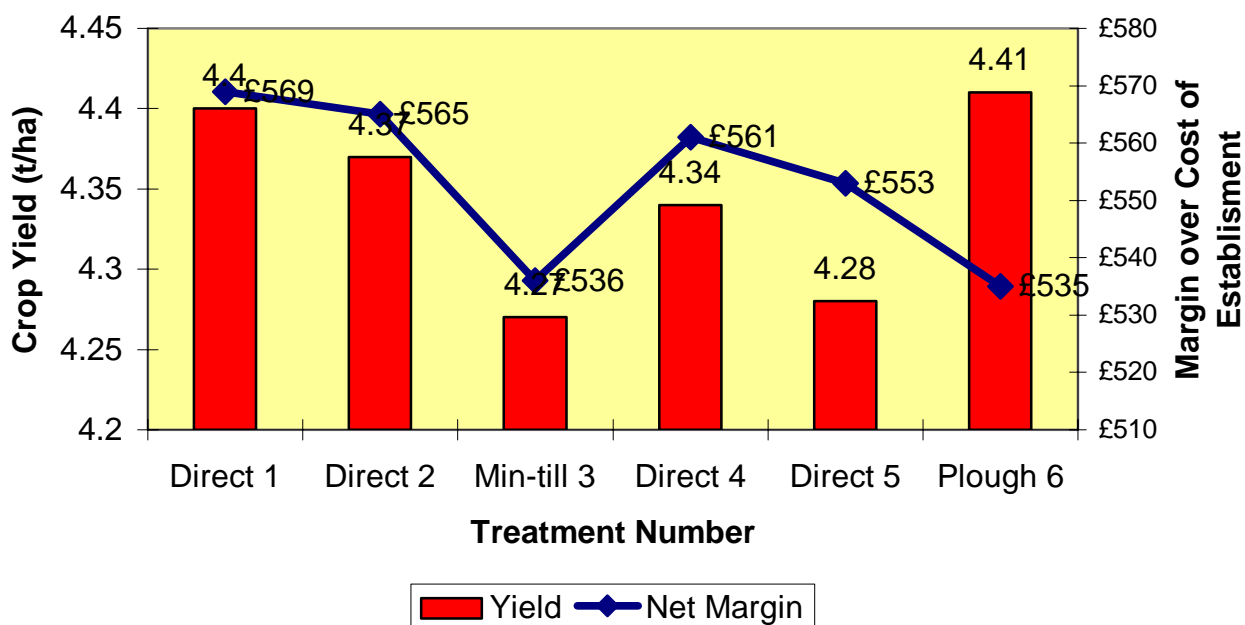
As an indication of how much volunteer competition in the autumn held back development, the following table illustrates the degree of flowering in each treatment recorded on the 17th April.

Earliness of flowering on a 1-9 scale (1 very late – 9 very early)

Trt no.	Method of oilseed rape establishment	Earliness of flowering (1-9 scale)
1.	Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	2.3
2.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered before the discs.	2.3
3.	Vaderstad Carrier with trash rake (two passes) – seed applied with Terracast delivered before the discs on the second pass.	2.7
4.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after the discs.	2.7
5.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after carrier roll.	2.7
6.	Plough and press- Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	9.0

vi) Yield t/ha and margin £/ha after establishment costs
(NB variable costs and other fixed costs have not been deducted)

Final Crop Yield and Margin Over Cost of Establishment



Trt no.	Method of oilseed rape establishment	Yield		Margin after establishment costs only (£/ha)
		t/ha	%	
1.	Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	4.40	99.78	569
2.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered before the discs.	4.37	98.96	565
3.	Vaderstad Carrier with trash rake (two passes) – seed applied with Terracast delivered before the discs on the second pass.	4.27	96.87	536
4.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after the discs.	4.34	98.45	561
5.	Vaderstad Carrier with trash rake (one pass) – seed applied with Terracast delivered after carrier roll.	4.28	96.90	553
6.	Plough and press- Vaderstad Carrier (one pass) – seed applied with Terracast delivered before the discs.	4.41	100.00	535

LSD (P=.05)

0.179 t/ha

CV

2.27 %

Grand Mean

4.35 t/ha

Despite the low cv there was no significant difference in yield between any of the blocks, thus the cheapest establishment techniques were therefore the best ie one pass with the Carrier. The most expensive establishment technique (Carrier on ploughed ground) was least cost effective but was between 0-3% higher yielding than the minimal tillage treatments.

vii) Appendix

Crop: Winter Oil Seed Rape

Location: Dover

Soil Type: Batcombe

Soil Analysis (p.p.m): P- 16, K-191, Mg-58, Mn-621, S-9, pH-7.3,

Previous Crop: Spring Barley

Drill Date: 05/09/01

Harvest Date:

Variety:

Seed Rate:

Fertiliser: Product: Rate: Date:
Double Top 40 kg/haN 03/03/02
17.5 kg/haS

N34.5 130 kg/haN 22/03/02

Fungicides:	Punch C	0.4 l/ha	03/11/02
Herbicides:	Falcon	0.2 l/ha	25/09/01
	Falcon	0.6 l/ha	03/11/01
	Fortrol	0.75 l/ha	21/11/01
	Kerb	1.0 kg/ha	21/11/01
Insecticides:	Cypermethrin	250 ml/ha	25/09/01
Desiccant	Roundup	3.0 l/ha	11/07/02
	Spryte	0.5 l/ha	11/07/02