



**PROJECT REPORT No. OS55**

**NON-TILLAGE ESTABLISHMENT OF OILSEED RAPE  
USING THE “AUTOCAST” TECHNIQUE**

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USING THE “AUTOCAST” TECHNIQUE**

by

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## **ABSTRACT**

This study examined a novel method of sowing oilseed rape that involves spreading the seed into the stubble of the preceding crop as it is harvested. Demonstrations were set up to show growers how the system worked and user comments were recorded by means of a survey.

The quest for a more reliable method of establishing oilseed rape that would enable growers to predict plant populations continues. Non-tillage methods provide another approach to establishment. The Autocast method of establishing the crop was largely successful in the three consecutive wet autumns of the project.

Slug damage was the greatest problem and it is likely that the pest is more of a problem with this method than with more conventional methods. This is because they can feed undetected on the soil surface but underneath the straw mulch. In a survey, slugs were identified as the cause of most crop failures or severe crop damage. Damage was worse on headlands. Slugs also hit crops that had been conventionally established on the same or neighbouring farms but there were no direct comparisons.

Soil conditions were critical to success; if there was no surface tilth as a result of compaction poor establishment was likely. The self-structuring clay soils (eg Hanslope series) are therefore most appropriate candidates for using this technique. In wet seasons, however even on these soils care has to be taken to ensure that there is no surface compaction. Using a non-tillage technique on soil types prone to capping is risky.

An advantage from not disturbing the soil surface was the absence of an autumn flush of weeds. In many cases a broad-leaved herbicide was not required representing a considerable saving in growing costs.

Autocasting produced a considerable saving in the cost of establishment and a major saving in time at a busy period of the farming year. However several growers commented on the additional management time after sowing, some of which was associated with learning a new system.

Guidelines for the use of this approach to oilseed rape establishment are presented.

## **SUMMARY**

This study examined a novel method of sowing oilseed rape that involves spreading the seed into the stubble of the preceding crop as it is harvested. It examined the practicality of the system by means of demonstration plots and by recording the experience of farmers who had tried the system. The main objective was to provide independent guidelines for its use.

Oilseed rape growers are frequently disappointed because establishment is poor. This, coupled with reduced margins, means that many consider giving up growing the crop. HGCA and other organisations have carried out much research on establishment in an attempt to make it more reliable. High seed rates are seen as the only reliable method of ensuring a good crop but often can result in over-thick crops that are more prone to lodging and disease. If a more reliable method of establishment could be found growers would have more confidence in reducing seed rates, which has a beneficial effect on the crop canopy and yield.

The main thrust of the project was to monitor the success of the introduction of the system on farm, identifying problems and producing guidelines for the systems' successful adoption. This was done by postal surveys and visits to "Autocast" growers. Field scale demonstrations of the system were sown in autumn 1998, 1999, 2000 and 2001 and open days were held in each autumn and following spring/summer.

In general over the three years the Autocast established oilseed rape yielded as well as the alternative methods at a considerable saving in cost.

Most growers agreed that slugs were the main threat. Many used sulfonylurea herbicides or products containing diflufenican in the previous wheat crops and reported no effects on establishment of the oilseed rape. Some commented on the lack of broad leaved weeds in their Autocast crops, which meant that no broad-leaved weed herbicide was required (a significant saving in growing costs). The requirement for some surface tilth was demonstrated at Otley in 2001. Several growers commented that although the straw choppers on the combine spread the straw fairly effectively (although this was affected by cross winds) the effectiveness of the chaff spreaders was poor. Most applied about 40 kg/ha N to the crop within a month of sowing to encourage establishment.

The Guidelines for using the system were revised in the light of the grower surveys and the demonstration trials at Otley during 1999 – 2001. They are presented as a check list.

## 1. INTRODUCTION

The major technical uncertainty on the production of rape in the Eastern Counties, which represents 44% of English area, is crop establishment. Rainfall is often very low at the critical time of year and this regularly leads to either very early establishment, with farmers taking advantage of any moisture in early August, or too late establishment. This results in variations in yields and the increase in inputs required to optimise returns. Forward crops usually require additional fungicides and backward crops usually require additional herbicides.

Hence, at a time of financial uncertainty, it is desirable to improve the reliability of crop establishment and production. Establishment of oilseed rape by sowing seed into a standing crop of wheat prior to harvest was explored in the 1980's. The practice was used commercially but problems of patchy establishment resulted in the technique being abandoned.

Oilseed rape growers are frequently disappointed because establishment is poor. This, coupled with reduced margins, means that many consider giving up growing the crop. HGCA and other organisations have carried out much research on establishment (eg HGCA Research Review OS 10, Project Reports OS 13, 29 and 30) in an attempt to make it more reliable. High seed rates are seen as the only reliable method of ensuring a good crop but often can result in over-thick crops that are more prone to lodging and disease. If a more reliable method of establishment could be found growers would have more confidence in reducing seed rates, which has a beneficial effect on the crop canopy and yield.

A novel method of establishing winter oilseed rape was devised by farmer Michael Godfrey and marketed from 1997 onwards as the "Autocast" system. This recent development using a machine attached to the combine header has renewed interest. This is a significant step forward from the previous work because the seed is applied to the soil surface and a chopped layer of straw and chaff is spread evenly across the header width. The success of this technique appears to be the subsequent consolidation of the straw mulch by rolling to ensure good seed to soil contact.

This project examined the practicality of the system by means of demonstration plots and by recording the experience of farmers who had tried the system. The main objective was to provide independent guidelines for the use of the system.

## 2. METHODS

The main thrust of the project was to monitor the success of the introduction of the system on farm, identifying problems and producing guidelines for the systems' successful adoption. This was done in the following ways:

- Postal surveys were done in 1999 and 2000.
- Demonstrations of the system were sown in autumn 1998, 1999, 2000 and 2001.
- Open days were held in each autumn and following spring/summer.
- Visits were made to "Autocast" growers in 1999 and 2000.
- Presentations were made to growers at Morley Research Centre winter meetings 1999, 2000 and 2001, Power-in-Action Event at Otley on 8 September 1999, the HGCA Oilseeds Committee (5 October 1999, 4 April 2000) and the HGCA Roadshow at Newmarket on 5 December 2000.
- Press interviews with journalists from the major arable business magazines (Crops, Arable Farming, Farmers Weekly and CPM) and on radio (Radio Lincolnshire).

### 3. RESULTS AND DISCUSSION

#### 3.1 Description of the Autocast system

The system comprises of a seed hopper that is attached to the rear of the combine header; a fan and manifold that distribute seed to spreading plates attached to the lower rear of the header and a land wheel which meters the seed. Seed rate is adjusted by means of sprockets. Seed is spread on to the soil and the chopped straw and chaff is spread on top of the seed as the harvester moves forward. (see Figure 1.) There is a monitoring device in the combine cab to reassure the operator that the system is operating correctly. At the end of a run when the operator lifts up the header the land wheel disengages and the seed stops flowing until the header is lowered to the ground for the next cut.

Figure 1. *The Autocast system in operation*



#### 3.2 Establishment demonstration

A demonstration of the Autocast system was established at Otley, Suffolk in 1998/99, 1999/00 and 2000/01. The site has a clay loam soil of the Hanslope/Beccles soil series which in a normal year (with a dry summer) produces a good tilth through weathering of the soil surface. This demonstration compared the Autocast with ploughed or direct-drilled methods of oilseed rape establishment. This was an unreplicated comparison of the systems.



### 3.2.1 1998/99

The demonstration compared the Autocast with ploughed or minimally cultivated methods establishment. In addition the seed was broadcast into the wheat crop prior to harvest using a pneumatic fertiliser spreader.

Apex was sown at 6 and 3 kg/ha for all treatments. Slug pellets were thoroughly mixed with the seed in a cement mixer prior to autocasting (4 kg/ha Mini Pellets (6% w/w metaldehyde)) and applied soon after drilling to the other establishment methods.

The Autocast and broadcast plots were sown on 17 August and the cultivated plots on 21 August. The non-tillage plots were either rolled using ribbed rolls, a double press or left unrolled on 18 August. The first significant rainfall of 9 mm fell on 23 August.

Establishment was good on all treatments. The plants grew through the straw mulch and had a characteristically extended hypocotyls (see figure 3). A top dressing of 40 kg/ha N was also examined this gave a visual improvement in crop vigour during the autumn.

Slug pellets were applied with the seed on the Autocast treatment and after harvest to the broadcast treatment. Pellets were not applied at sowing on this treatment due to the risk of pellets contaminating the wheat at harvest. The areas were monitored for slugs and pellets were applied after emergence to all areas.

Weed levels in the field were generally low. Groundsel was the most numerous weed and this was flowering over winter on the Autocast area. Other wind blown space invading species such as sow thistles were evident in the summer. Thistles are particularly successful in gappy crops. The level of infestation was not considered high enough to justify the cost of a herbicide (clopypalid). The ploughed and minimum cultivated areas were sprayed with Butisan S plus trifluralin pre emergence (1.5 l/ha metazachlor plus 2.0l trifluralin).

The different areas were monitored through the season for differences in disease levels and lodging but none were found. At harvest the individual areas were harvested and there was very little difference between the systems used. The demonstration area was not replicated so no statistical comparisons were attempted (see Figure 2).

Figure 2. Yield of oilseed rape (t/ha), Otley establishment demonstration, 1999

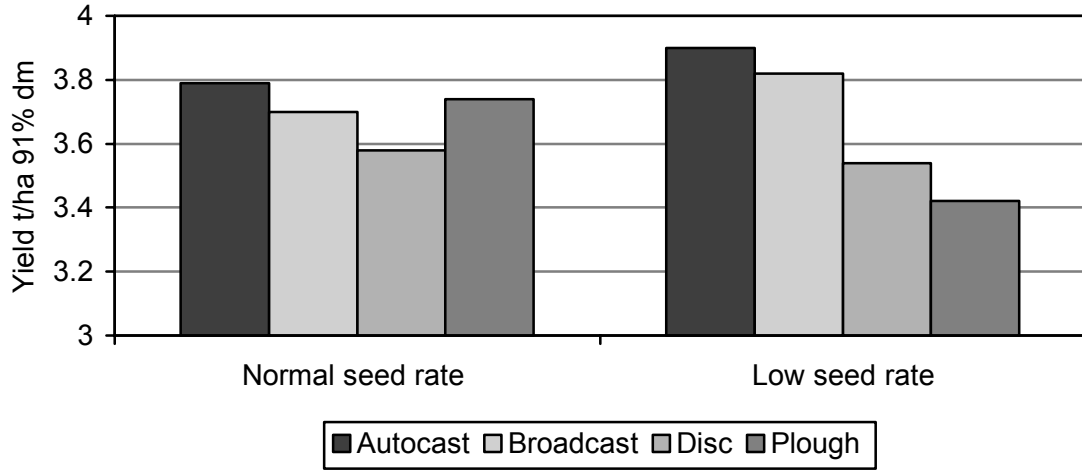
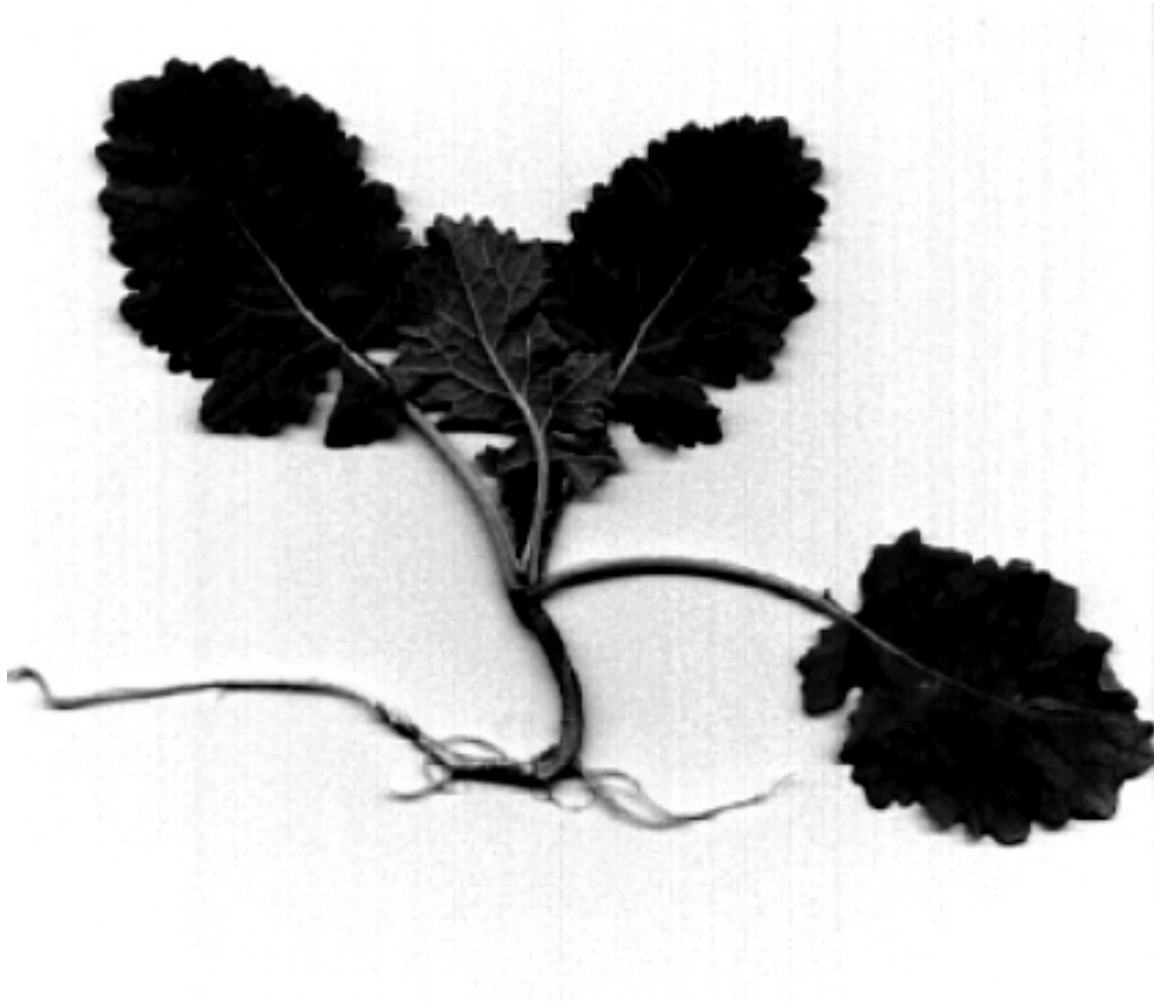


Figure 3. *Typical growth habit of Autocast oilseed rape. Note extended hypocotyl is caused by growing through straw mat.*



### 3.2.2 1999/2000

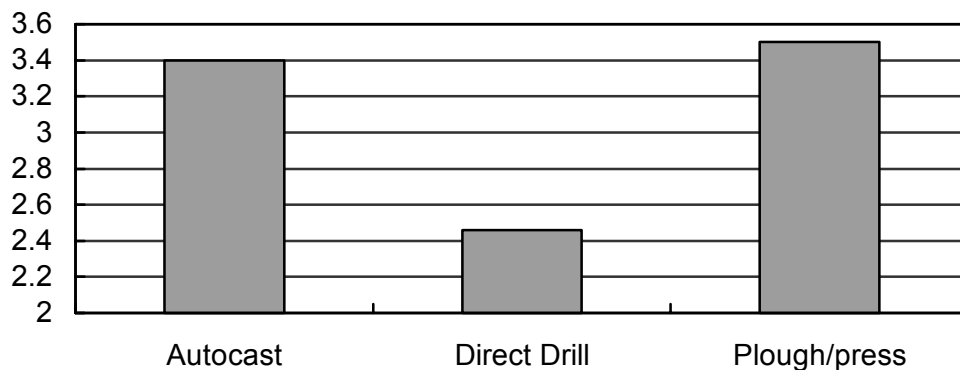
A demonstration of the Autocast system was again established at Otley. This demonstration compared the Autocast with ploughed or direct drilled methods of oilseed rape establishment. Apex was sown at 4 kg/ha for all treatments.

The Autocast area was sown on 28 August 1999 and the direct drilled plots on 31 August and the ploughed area on the 4 September. The plots were all rolled using ribbed rolls after sowing. Establishment was less successful than the previous season. The main reason for this was slugs and lack of surface tilth due to a wet summer. At the time of sowing there was little surface moisture although below the surface the soil was very wet. This was likened to a “pie crust”. A large proportion of the Autocast area in the demonstration field failed. Additional seed was spun on using a slug pellet spinning disc spreader mounted on an ATV. The plant population was below 20 plants/m<sup>2</sup> in places

but decision to re-drill with spring rape on part of the site was taken if there were less than 10 plants/m<sup>2</sup>. Enough plants established in 30% of this area and was taken to yield. The suspected cause of this failure was picked up in the questionnaire. Shortly after the dry spell during the sowing period heavy rain fell. Autocast and direct-drilled areas of the field became waterlogged, resulting in poor establishment.

The space invading weeds (groundsel and sow thistles) took advantage of the thin stand and 0.3 l/ha Dow Shield was applied to the Autocast area.

Figure 4. Yield of oilseed rape (t/ha). Otley establishment demonstration 2000

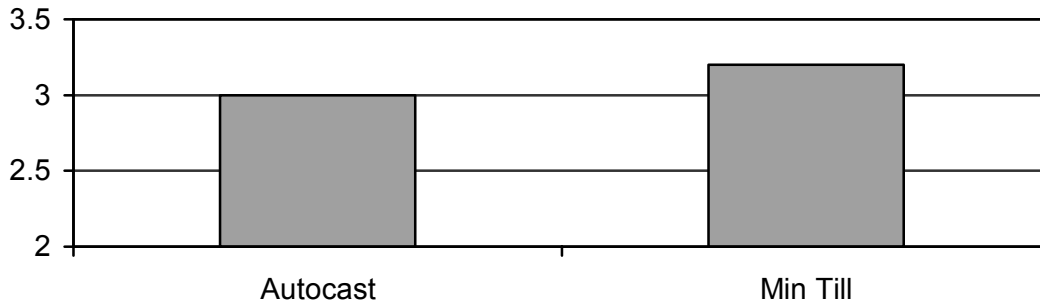


### 3.2.3 2000/2001

An extension to the original project was approved to test the system in a dry autumn. Needless to say the autumn was a wet one. The autocasting was done on 28 July 2000 and the crop established satisfactorily. Sub soiling after autocasting was tested on the headlands in an effort to improve establishment. The cultivation appeared successful in that the plant population was similar to that observed in the body of the field. The additional weeds that emerged with the crop were not sufficient to warrant additional herbicide.

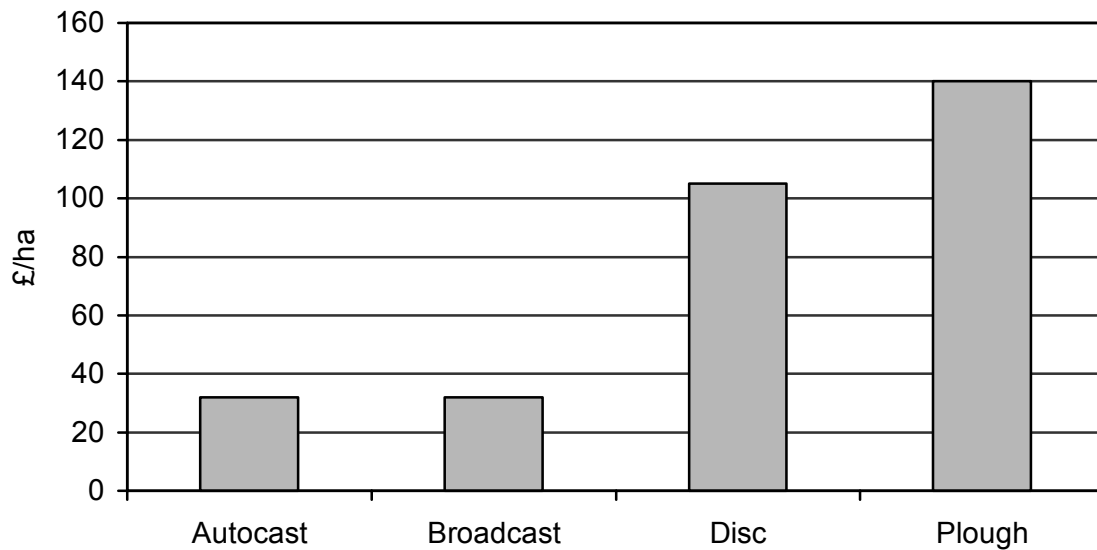
Due to adverse weather conditions the minimal tillage (discs and press) area was not drilled until 23 September so a direct comparison not possible. However the relative yields from different techniques is presented in Figure 5.

Figure 5. *Yield of oilseed rape (t/ha). Otley establishment demonstration 2001*



In general over the three years the Autocast established oilseed rape yielded as well as the alternative methods at a considerable saving in cost. Estimates of the relative costs are presented in Figure 6.

Figure 6. *Relative cost of different systems of establishment for oilseed rape on a clay soil (£/ha). Otley, 1999 – 2001.*



### 3.3 Questionnaire

A questionnaire was sent in the spring/early summer of each year to all growers who had purchased the machine (see Appendix). There was a high response (66% and 50% in each year). As well as a postal survey and telephone interviews, visits were made to crops that had been "Autocast" and the farmers interviewed (this included a visit in conjunction with the HGCA Oilseeds Committee on 4 April 2000).

#### *Slugs*

Most growers agreed that slugs were the main threat. This pest is a major problem with all methods of oilseed rape establishment and it is difficult to disentangle the direct effect of Autocasting from seasonal fluctuations in the level of damage. However the perception was that Autocast crops were more susceptible to attack. This was thought to be because the pest could move undetected under the straw mulch surface. As well as mixing slug pellets in with the seed most growers applied at least two half doses of pellets post drilling during the early autumn.

#### *Herbicide residues*

Many growers used sulfonylurea herbicides or products containing diflufenican in the previous wheat crops and reported no effects on establishment. These herbicides are active against oilseed rape and there was concern that there would be residues in the surface layers of the soil in sufficient quantity to affect germination/establishment. There are label recommendations to plough before planting subsequent crops to minimise this risk. The use of pre-harvest glyphosate was also perceived as a risk as there is a label warning not to use glyphosate treated straw as an horticultural mulch. However in field conditions this is unlikely to be a problem and none of the growers questioned encountered a problem. The risk would be greater if high doses had been applied and the seasons had been dry.

#### *Weeds*

Many growers commented on the lack of broad leaved weeds in their Autocast crops, which meant that no broad-leaved weed herbicide was required (a significant saving in growing costs). Volunteer cereals and grass weeds however were prolific and tended to emerge with the crop and therefore compete earlier than with other establishment methods. As seen in the demonstration site at Otley thistles and groundsel were mentioned. Thistles were a feature of many oilseed rape crops in the seasons when the survey was done mainly because of the moist soil conditions for most of the year that enabled wind blown seeds to establish in areas of thin plant population. This phenomenon was not limited to Autocast crops.

#### *Soil conditions*

The requirement for some surface tilth was demonstrated at Otley in 2001. Capped soils or ones with compaction resulted in poor establishment. This was often the case on the

headlands of fields and the combination of slugs and compaction resulted in many Autocast crops having poor headlands. Crops that were Autocast onto soils with impeded drainage due to compaction tended to suffer later in the autumn, as their roots became water logged.

A benefit from this method was the ability to use the previous crop's tramlines. The travelling was often easier. Some growers sub soiled these tramlines to alleviate compaction, however in one case this resulted in a flush of broadleaved weeds that then had to be controlled.

#### *Stubble length*

The manufacturers of the Autocast equipment recommend leaving a longer stubble height when harvesting the wheat crop. This is claimed to deter pigeons. The action of rolling or pressing the seed in to the soils after autocasting did not flatten the stubble in the Otley demonstration. The pigeons were not deterred by stubble length in the demonstration area. This was mainly because the crop grows through the stubble over winter. The length of stubble does however affect the amount of straw that passes through the combine harvester and so reduces the amount that has to be spread.

#### *Quality of spreading*

Several growers commented that although the straw choppers on the combine spread the straw fairly effectively (although this was affected by cross winds) the effectiveness of the chaff spreaders was poor. This resulted in dense patches of chaff, which impeded emergence of the rape.

#### *Consolidation*

All growers commented on how essential rolling was to the success of the system. Most followed the manufacturer recommendation and rolled immediately after combining if soil moisture is sufficient or immediately after rain if conditions are dry at the time of combining.

#### *Autumn nitrogen*

Most growers applied about 40 kg/ha N to the crop within a month of sowing to encourage establishment. (This is more than is recommended under Good Agricultural Practice and may reflect the anxiety of the grower to obtain a good establishment.

#### *Extended hypocotyls*

Concern was expressed that the extended hypocotyls resulted in a "walking stick" shaped stem with the base of the stem resting on the soil surface exposed to the elements. No adverse effects from frost, disease or lodging were observed however.

### *Modifications*

A significant number of growers surveyed planned to modify the system to improve the establishment, particularly to overcome surface compaction or the lack of surface tilth. This has been as a result of a series of wet summers where soil conditions have suffered. The mounting of the machine on some form of cultivator was the most popular modification although this meant that the time advantage of harvesting and sowing in one operation was lost. A new device has since been introduced by the manufacturer known as the “Terracast” which can be mounted on a cultivator.

The manufacturer supplies husbandry guidelines with the machine, which were generally followed closely by the growers questioned



#### 4. GUIDELINES

The Guidelines for using the system were revised in the light of the grower surveys and the demonstration trials at Otley during 1999 – 2001. They are presented below as a check list. They were first presented to growers at the HGCA Roadshow, Newmarket, 5 December 2000 but have been updated here in the light of the last year of the project.

1. System most suited to self-structuring clay soils that have developed a surface tilth
2. Husbandry of preceding crop
  - avoid high doses of DFF or sulfonylureas (check label re following crop)
  - choose later maturing variety of wheat, later sown
3. Mid August is the ideal time to sow
  - admix slug pellets
  - leave a long stubble (20 –30 cm)
  - spread straw and chaff evenly (leaving a long stubble reduces the amount of straw)
4. Roll or press immediately after drilling
  - and repeat after significant rainfall (5mm+) if seed not chitted
5. Monitor for slug activity
  - daily until after emergence and then weekly
  - treat again if active
6. Apply seed bed nitrogen according to Good Agricultural Practice

## **5. FURTHER WORK**

The system has not been tested in a dry autumn since its commercialisation (although it was developed during a period of dry autumns). An extension of the demonstration by one year to test the system in drier time failed due to wet weather. It is recommended that some low level monitoring should continue but no further work substantive be undertaken unless further problems arise that require investigation.

## **6. ACKNOWLEDGMENTS**

The author would like to acknowledge the assistance given by the Felix Thornley Agricultural Trust for hosting the demonstration at Otley, the HGCA for funding the project and Michael Godfrey and Peter Eaden for their cooperation with the supply of equipment and addresses of the Autocast growers. Autocast and Terracast are registered trademarks of G & E Agriculture Ltd., The Old Schoolmasters House, Groton, Sudbury, Suffolk, CO10 5EE.

## APPENDICES

### Autocast questionnaire results - 1999

Return on questionnaire percentage = 66%

- **Total number of hectares of OSR farmed by the farmers who responded = 3406ha**
- **Total number of OSR hectares established by Autocast = 2742ha (80.5%)**
- **Total number of OSR hectares established by conventional methods = 664ha (19.5%)**

What was the soil type where the fields were sown by Autocast?

Heavy soils	97%
Light soils	3%

Do you think soil type is important?

Yes	No	Not sure
28%	41%	31%

What was the previous crop?

Wheat	80%
Barley	17%
Other	3%

Did you use any of the following chemicals on the previous crop that contain diflufenican (DFF)?

Ingot	Yes	0%
Ardent	Yes	7%
Javelin/Panther	Yes	24%
Amazon	Yes	3%

Did you use any sulfonylureas or Dagger in that crop?

Ally/Jubilee/Lorate	Yes	48%
Harmony M	Yes	3%
Lexus XPE	Yes	7%
Ally Express	Yes	0%
Lexus 50 DF	Yes	7%
Dagger	Yes	3%

Did you use pre-harvest glyphosate?

Yes	No
24%	76%

What was its yield? (t/ha)

	<5	5.1 – 6	6.1 - 7	7.1 - 8	8.1 - 9	9.1 - 10	>10
Wheat	7%	0%	0%	28%	31%	24%	3%
Barley	0%	0%	7%	3%	0%	0%	0%

What was the sowing/harvesting date?

August				September	Not Stated
1 <sup>st</sup> Wk	2 <sup>nd</sup> Wk	3 <sup>rd</sup> Wk	4 <sup>th</sup> Wk	1 <sup>st</sup> Wk	
7%	35%	31%	10%	7%	10%

Was the seed farm saved or purchased?

Farm Saved	56%
Purchased	44%

Was the seed dressed?

Yes	No	Not stated
70%	20%	10%

Did you mix slug pellets with the seed?

Yes	No
97%	3%

What type of rolls did you use?

Cambridge roll	Double press	Other	No roll
81%	13%	3%	3%

When did you roll?

August				September
1 <sup>st</sup> Wk	2 <sup>nd</sup> Wk	3 <sup>rd</sup> Wk	4 <sup>th</sup> Wk	1 <sup>st</sup> Wk
0%	15%	45%	25%	15%

How many days after sowing did it rain?

Days	1-5	6-10	11-15	16-20	21+	Not sure
	39%	24%	3%	3%	3%	28%

How much rain fell between sowing and rolling?

0mm	1-5mm	6-10mm	11-15mm	Not stated
24%	10%	17%	14%	35%

How many additional dressings of slug pellets did you apply?

Dressings	0	1	2	3	4
	3%	42%	28%	17%	10%

What percentage of your OSR acreage did you Autocast?

%	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
	0%	4%	0%	4%	14%	3%	10%	24%	7%	34%

Did you bale the straw?

Yes	No
10%	90%

Did the combine spread the straw from the previous crop satisfactorily?

Yes	No	Not stated
90%	3%	7%

Did the combine spread the chaff from the previous crop satisfactorily?

Yes	No	Not stated
93%	0%	7%

Did you alter the height of cut from normal?

Yes	No
52%	48%

Did the Autocast crop emerge satisfactorily?

Yes	No	Variable
55%	14%	31%

If so, how long after Autocasting?

1 wk	2 wks	3 wks	Not stated
24%	55%	7%	14%

If not, what do you think the reason was?

Slugs	69%
Too much straw	15%
Too dry	15%
Soil too wet	8%
Seed vigour	8%

Did you do any additional cultivations after Autocasting?

No	90%
Sub-soil tramlines	7%
Land packing	3%

Did the headlands emerge as well or better than the field?

Headlands Worse	55%
Headlands better	14%
No difference	31%

Will you use the method again?

Yes	No	Not sure
90%	0%	10%

What changes would you make?

Drill Date	3%
Roll/press	24%
Use of Round-up	10%
Pre-harvest slugs pellets	10%
Slug pellets near hedgerows/ extra in headlands	14%
More attention to headlands	10%
Landpacker	10%
Vary seedrate	14%

Month of autumn N application?

August	September	October	None
46%	35%	15%	4%

How much autumn nitrogen was applied to the crop?

Kg/ha	0 – 20	21 – 40	41 – 60	60+
%	7%	26%	45%	22%

Did you use a broad leaf herbicide?

Yes	No
36%	64%

How many applications of a specific graminicide did you apply?

One application	Two applications
57%	43%

Was this more than you would expect to apply to your conventionally established crop?

Yes	No
36%	64%

Did you apply any additional fungicide to the Autocast crop in the autumn?

Yes	No
21%	79%

If yes, was this;

Because it was sown earlier?

Yes	No
17%	7%

Because you saw downy mildew?

Yes	No
14%	3%

Because you saw phoma early?

Yes	No
17%	7%

Additional comments:

Understanding of slug populations early is essential.	17%
Broad leaf weeds have not been a problem, possibly due to straw.	3%
The crop vigour has been improved by the Autocast system	10%
Land packing is essential	3%
The crop can become a total failure if slugs are not appropriately controlled.	17%
PGR may be required.	7%

## Autocast Questionnaire Results – 2000

### General details

- From the 84 autocast surveys issued 42 replies were received i.e. a 50% response rate.
- The total area of OSR grown by farmers who responded was slightly in excess of 4000 ha (c.f. 3500 ha previous year). Of this area 83% was Autocast (c.f. 80% last year).
- 95% of growers were producing on medium to heavy land.
- 40% of those autocasting thought that soil type was important.

### Previous cropping

Wheat	92%
Wheat and Barley	7%
Other	1%

### Previous cropping herbicide usage

Diflufenican (DFF)	38%
Sulphonyl Ureas (and Dagger)	55%
Pre harvest glyphosate	31%

- The average previous winter wheat crop yield was 9.8t/ha  $\pm$  0.19t/ha

### Autocasting the crop

- Only 5% of growers baled any of the straw pre autocasting.
- Most were happy with straw and chaff distribution post combine, with only 14% and 10% dissatisfied with straw and chaff distribution respectively.
- 80% of growers increased the height of their combine bed when cutting.
- 90% of growers carried no additional cultivation specific to autocasting.

### Sowing dates

	<b>2000</b>	<b>1999</b>
Aug wk 1	17%	7%
Aug wk 2	20%	35%
Aug wk 3	29%	31%
Aug wk 4	29%	10%
Sept wk 1	2%	7%
Other	3%	10%

### Seed source

Farm saved	44%
Purchased	41%
Mix of Both	15%



- The average seed rate used was 5.6 kg/ha  $\pm$  0.16 kg/ha.
- 61% of all seed was dressed (c.f. 70% in 1999), of these only 16% indicated an insecticide component to the dressing.
- All growers surveyed included slug pellets in seed when drilling.
- All growers surveyed applied additional slug pellets post drilling to at least part of their area. The average was an additional two applications per crop.

### Post drilling activity

- After drilling 98% of farmers either Cambridge rolled or double pressed, generally within 48 hours of sowing.
- Most sites were only rolled once (with only 20% of sites receiving more than one roll).
- The average rainfall between drilling and rolling was 4.8mm  $\pm$  1.33mm, with 19% of sites receiving >10mm and 59% of sites no rain at all.

### Days to first rainfall

0-4	5-9	10-14	$\geq$ 15
68%	15%	3%	15%

### Crop emergence

#### Days to emergence

<7	63%
8-14	34%
>14	3%

#### Was emergence satisfactory

	<b>2000</b>	<b>1999</b>
Yes	86%	55%
No	2%	14%
Unsure	12%	31%

#### Were the headlands better or worse than the rest of the field

Better	10%
Worse	70%
Same	20%

#### Would you use this method again

	<b>2000</b>	<b>1999</b>
Yes	97%	90%
No	3%*	-
Unsure	-	10%

\* no longer farming.

### Crop application details

- The average rate of autumn applied N was 48 kg/ha  $\pm$  3.4 kg/ha, with 56% of sites receiving between 40 & 60 kg/ha N (c.f. 45% of sites in 1999).

#### Time of N application

	<b>2000</b>	<b>1999</b>
Aug	50%	46%
Sept	42%	35%
Oct/Nov	5%	15%
None	3%	4%

### Weeds and diseases

- Regarding weed control, graminicides were used on all sites with 56% of sites receiving broad leaf weed sprays to at least part of the area.
- 52% of sites received two or more graminicide sprays.
- 80% of growers thought their herbicide input was no more than they would expect to use on a conventionally established crop.
- Main weed problems cited were general grass weeds, thistles and cleavers.
- Autumn fungicide applications were carried out on 32% of all sites.
- All of the fungicide applications were at least partially credited to appearance of disease symptoms (as opposed to earlier sowing of the crop), in 30% of sites this was attributed to phoma.

### General comments

- 36% of growers quoted slugs as their major problem (with 5% indicating pigeons).
- 26% of those surveyed had problems with headland establishment.
- 14% intend to customise or alter their cultivation practices and/or rolling to suit specific situations and to improve establishment.
- 10% felt establishment could be improved via alterations to drilling parameters (e.g. seed rate).
- 5% of growers thought the technique involved excessively high management input.

### Summary

The vast majority of autocast OSR followed wheat. Crops were generally sown in mid Aug at an average rate of 5.6 kg/ha and Cambridge rolled once within 48 hours; 86% of growers achieved a satisfactory emergence. The main management inputs involved in establishment were slug and grass-weed control, although most growers felt that their total herbicide usage was in line with that of a conventionally established crop. Approximately 97% of crops received an autumn N application in Aug/Sept with an average crop being dressed with 40-60kg/ha N. A third of all crops had an autumn fungicide application, which was primarily targeted at phoma. Of all growers surveyed in this study 98% stated they were happy with autocasting as a method of establishment.

Figure 7. *Rainfall at the demonstration site, Otley Suffolk, 1998 – 2001*

