PROJECT REPORT No. OS40

THE INFLUENCE OF DRILLING DATE ON THE PERFORMANCE OF WINTER OILSEED RAPE

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INFLUENCE OF DRILLING DATE ON THE PERFORMANCE OF WINTER OILSEED RAPE

by

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SUMMARY

The optimum drilling date for Winter Oilseed Rape is considered by many growers to be towards the end of August and preferably no later than early September. In recent years Winter Oilseed Rape drilling dates have moved even earlier facilitated mainly by the presence of set aside in farm rotations. This has released land for early cultivation and many growers have opted for winter oilseed rape rather than early cereals in this part of the sequence.

However a number of growers deliberately opt for later drilling dates preferring early September mainly on the grounds that establishment can often be more uniform and rapid and the workload conflicts less with harvesting operations.

These drilling date decisions have been set against a backdrop of conventional varieties but the introduction of both variety associations and restored hybrids has raised questions about the validity of these drilling decisions. Both these new types of varieties are claimed to have more early vigour and are recommended to be drilled at lower seed rates based on the improved vigour argument and the higher cost of seed. At early drilling dates the breeders of variety associations and restored hybrids recommend seed rates of 80 seeds/m^2 compared to conventional seed rates of 120 seeds/m^2. Using higher seed rates of these more vigorous variety types may produce the wrong crop structures if they are drilled early. Equally conventional varieties usually perform less well when drilled later but variety associations and restored hybrids containing 'hybrid vigour' may perform better than conventional varieties at later drilling dates.

These questions were explored in a seed rate, drilling date trial conducted at five locations in England and Scotland. One variety from each type of winter oilseed rape was selected.

conventional	-	Apex
variety association	-	Synergy
restores hybrid	-	Pronto

Each variety was drilled at two seed rates 80 and 120 seeds/m^2 which reflected general farming practice for variety association/hybrids and conventional varieties respectively.

The trials were conducted at five locations and undertaken by three organisations, Arable Research Centres (ARC), Scottish Agronomy (SA) and Morley Research Centre (MRC)

ARC (Cirencester)	-	Gloucestershire
ARC (Great Carlton)	-	Lincolnshire
ARC (Dunmow)	-	Essex
SA (Kinross)	-	Perthshire
MRC (Otley)	-	Suffolk

The target drilling dates were spread across the early to late range and were

- August 20th
- August 28th to September 1st
- September 5th

The actual drilling dates achieved at the five sites were as follows:

Location	Drill Date 1	Drill Date 2	Drill Date 3
Kinross	19 August	27 August	11 September
Cirencester	21 August	2 September	14 September
Great Carlton	22 August	4 September	16 September
Dunmow	28 August	4 September	16 September
Otley	21 August	2 September	14 September

The first drilling date at Dunmow was slightly delayed due to the late harvesting of the previous crop but otherwise the drillings were successfully achieved around the target dates.

Plant populations were assessed during October, when plants were between the 2-6 leaf stages. Due to the presence of volunteer rape plants, some counts in the earlier drilling dates gave more than 100% establishment, notably at Kinross and in drilling date 1 at Otley, which has not been included in the table of means due to the loss of meaningful differences between plots.

Plant Populations (plants/m^2) - Mean of 5 Sites (Autumn)

Variety	Seed Rate (seeds/$m^{2)}$	Drill Date 1*		Drill Date 2		Drill Date 3		Average Plants/m^2
		Mean	Range	Mean	Range	Mean	Range	
Apex	80	58	37-96	65	45-87	40	23-56	54
Apex	120	70	40-102	83	53-123	52	32-68	68
Synergy	80	48	28-64	54	33-68	43	32-56	48
Synergy	120	62	28-92	56	28-76	46	25-57	53
Pronto	80	57	23-92	56	28-76	46	25-57	53
Pronto	120							
Mean								

*Mean of 4 sites only for drilling date 1

The best level of establishment was achieved at Kinross (but note the presence of volunteers), and the worst at Cirencester. The middle drilling date gave the highest plant populations, and the late drilling date the lowest. 80 seeds/m^2 gave an average of 52 plants m^2 (65% establishment) over the three sowing dates, and 120 seeds/m^2 gave an average of 67 plants/m^2 (56% establishment).

Overall, Apex and Pronto established better than Synergy at the first two drilling dates, but Pronto was superior to Synergy and Apex at the third drilling date.

Further population assessments made post winter indicated plant losses as a result of winter most particularly with the later drilling date.

Variety	Seed Rate (seeds/$m^{2)}$	Drill Date 1*		Drill Date 2		Drill Date 3		Average Plants/m^2
		Mean	Range	Mean	Range	Mean	Range	
Apex	80	49	33-79	58	48-87	31	17-41	46
Apex	120	62	47-86	70	53-91	39	21-51	57
Synergy	80	46	30-71	53	33-78	33	17-47	44
Synergy	120	59	33-90	60	48-79	41	18-63	53
Pronto	80	52	32-77	58	46-83	37	20-56	49
Pronto 120	120	64	45-88	70	58-81	52	22-69	62
Mean								

*Mean of 4 sites for drilling date!
The overall reduction post winter was 7% lower than the autumn plant counts.

There was a very slight indication that Pronto maintained a small superiority in % establishment over Apex and Synergy at the third drilling date.

In general, crop vigour decreased with later sowing, and even by March growth of the third drilling date tended to be behind that of the first two. However, no significant vigour differences were recorded between either varieties or seed rates within each sowing date.

The yield data varied considerably both between sites and between drilling dates at any individual site.

Variety	Seed Rate (seeds/$m^{2)}$	Yield (t/ha) - mean of 5 sites			
		Drill Date 1*	Drill Date 2	Drill Date 3	Mean Yield
Apex	80	3.12	3.36	3.05	3.18
Apex	120	3.20	3.45	3.06	3.24
Synergy	80	3.60	3.48	3.44	3.51
Synergy	120	3.64	6.72	3.47	3.61
Pronto	80	3.38	3.60	3.21	3.40
Pronto	120	3.45	3.57	3.40	3.47
Mean					

*Mean of only 4 sites.

Overall the middle drilling date, that varied between August 27th and September 4th at the five locations was the highest yielding with the third drilling date (September 11th - 16th) the lowest yielding.

Two of the questions posed by the investigations related to performance of the variety association and hybrids when drilled either earlier or later than conventional drilling dates.

In overall terms Synergy was the highest yielding variety and Apex the lowest. At each of the three drilling dates that position was generally maintained. There was no indication that seed rate had a major influence on the performance of any of the three varieties overall. However at the individual locations there were some small interactions.

- the variety SYNERGY had a significant positive yield response to the higher seed rate at the third drilling date at Cirencester.

- the third drilling date at Great Carlton gave significantly lower yields for all treatments (compared to the second date) except for SYNERGY (80) and PRONTO (80)

- at the Dunmow location all varieties produced significantly higher yields at the third drilling date compared to the first or second dates. However APEX at 80 and 120 seeds/m^2 was significantly lower yielding at drilling date 1 compared to 2 whereas both SYNERGY and PRONTO were unaffected.

- at Otley the PRONTO at 120/m^2 was significantly lower yielding than 80 seeds/m^2 at the earliest drilling date suggesting that the populations (which were the highest of all treatments post winter) may have been too high.

- at Kinross the three varieties were lower yielding at the third drilling date but there were no interactions with seed rates.

There was little evidence therefore to support the view that hybrid varieties or variety associations required seed rate adjustments at early or late drilling times to maximise performance. However as the differences between seed rates were generally not significant this would suggest that lower seed rates were as effective as higher seed rates. This conclusion could also be drawn for the conventional variety Apex so there appeared to be no distinction between the varieties.

A further consideration is how variety performance in relative terms may be influenced by drilling date and seed rate.

In terms of variety performance related to drilling date an individual variety trial can be produced from each drilling date ranking the varieties in relation to their performance compared to APEX at 120 seeds/m^2.

Relative Yield Performance Compared to Apex at 120 seeds/m^2 (Mean of 5 locations)		
Drilling Date 1	**Drilling Date 2**	**Drilling Date 3**
Synergy (120) 113.7%	Synergy (120) 107.8%	Synergy (120) 113.4%
Synergy (80) 112.5%	Pronto (80) 104.3%	Synergy (80) 112.4%
Pronto (120) 107.8%	Pronto (120) 103.5 %	Pronto (120) 111.1%
Pronto (80) 105.6%	Synergy (80) 100.9%	Pronto (80) 104.9%
Apex (120) 100%	Apex (120) 100%	Apex (120) 100%
Apex (80) 97.5%	Apex (80) 97.4%	Apex (80) 99.7%

The rank orders of performance were very similar for the three drilling dates indicating that the influence of both drilling date and seed rate when averaged across these five locations had very little interaction with variety. The only small influence was that the hybrid variety had its largest yield advantage over Apex the conventional variety at the early and late drilling dates.

HGCA funding was provided for this trial series for the 1998/99 season. Whilst variations in performance were identified between the five trial locations there was no consistent response to seed rate/drilling date. However one season of data can be misleading and it is important that these types of studies are maintained for at least three seasons.

Contrary to expectations one location actually produced its highest overall yields at the third drilling date but generally yields were highest at the first or second drilling dates. There were indications of responses to seed rate but they were not restricted to specific varieties or drilling dates.

From one season it is difficult to draw from conclusions, however, the indications are that no adjustment to current practice should be made apart from the potential to reduce conventional variety seedrates to 80 seeds/m^2. The normal time of drilling, generally remains late August - early September but later drillings are possible particularly in the south of the country.

ABSTRACT

The introduction of variety associations and restored hybrid varieties of Winter Oilseed Rape has raised queries as to whether they should be treated in optimum drilling date and seed rate terms as conventional varieties. Currently it is suggested by seed companies that variety associations and restored hybrids should ideally be drilled at about 80 seeds/m^2 (compared to the conventional variety rate of 120 seeds/m^2) as the seed is more expensive and the varieties exhibit early hybrid vigour. It has also been suggested that these new introductions may be better suited to later drillings as they possess more hybrid vigour. The HGCA invited Arable Research Centres (ARC) to investigate these queries in collaboration with Scottish Agronomy (SA) and Morley Research Centre (MRC) in a project funded for one season.

Five locations were used in autumn 1998 ARC (Gloucestershire, Lincolnshire and Essex) SA (Perthshire) MRC (Suffolk) and at each location three varieties of Winter Oilseed Rape were drilled at three dates at two seed rates. The three varieties represented the three variety types available to growers Apex (conventional) Synergy (variety association) Pronto (restored hybrid) and the seed rates were 80 or 120 seeds/m^2. The three drilling dates were targeted as early (August 20th) normal (August 28th to September 1st) and late (September 15th).

The target drilling dates were successfully implemented and at each location two plant counts were undertaken one in the autumn and one post winter. Post winter plant populations from the different seed rates, varieties, drilling dates and locations ranged from 17 plants/m^2 (at a third drilling date) to 90 plants/m^2 (an early drilling date). However there were few consistent differences between treatments other than a slight indication that the restored hybrid Pronto produced the highest plant population of the three varieties when late drilled.

The response to drilling date illustrated some surprising inconsistencies in that at four locations yields were lowest at the third drilling date (particularly in Perthshire) but in Essex the third drilling date produced the overall highest yields.

	Response to drilling date (t/ha) Mean of 3 varieties x 2 seed rates				
	ARC Gloucestershire	**ARC Lincolnshire**	**ARC Essex**	**SA Perthshire**	**MRC Suffolk**
Drilling Date 1	3.26	3.75	2.54	4.03	N/A
Drilling Date 2	3.06	3.83	2.82	3.91	4.04
Drilling Date 3	3.26	3.24	3.59	2.42	3.84

N/A - discontinued due to excessive volunteers

Some significant yield differences were generated between varieties, seed rates and drilling dates but there was no clear indication that adjusting the seed rate improved the performance of the variety association or the restored hybrid at either early or late drilling dates. This indicated that on most occasions the lower seed rates (80 seeds/m^2) were as effective as the higher seed rates (120 seeds/m^2) at all drilling dates. However this conclusion also appeared correct overall for the conventional variety so no consistent seed rate effects were recorded between the varieties.

This is confirmed by the construction of three 'yield tables' incorporating the performance of the three varieties and two seed rates when presented as relative performance within a drilling date.

Relative yield performance compared to APEX at 120 seeds/m^2 (Mean of 5 locations)		
Drilling Date 1	**Drilling Date 2**	**Drilling Date 3**
Synergy (120) 113.7%	Synergy (120) 107.8%	Synergy (120) 113.4%
Synergy (80) 112.5%	Pronto (80) 104.3%	Synergy (80) 112.4%
Pronto (120) 107.8%	Pronto (120) 103.5%	Pronto (120) 111.1%
Pronto (80) 105.6%	Synergy (80) 100.9%	Pronto (80) 104.9%
Apex (120) 100%	Apex (120) 100%	Apex (120) 100%
Apex (80) 97.5%	Apex (80) 97.4%	Apex (80) 99.7%

The rank orders of performance were very similar for the three drilling dates indicating that the influence of both drilling date and seed rate when averaged across these five locations had very little interaction with variety.

TRIAL DETAILS

The drilling date trials were conducted at five locations.

ARC (Cirencester)	-	Gloucestershire
ARC (Great Carlton)	-	Lincolnshire
ARC (Dunmow)	-	Essex
SA (Kinross)	-	Perthshire
MRC (Otley)	-	Suffolk

At each location three drilling dates were targeted - August 20th
August 28th to September 1st
September 15th

at each drilling date the three varieties were sown at two seed rates 80 or 120 seeds/m^2

The three varieties were

Apex	-	conventional
Synergy	-	variety association
Pronto	-	restored hybrid

Seed was supplied from one initial source, sub divided and sent to each location. Each treatment plot was replicated three times.

The agronomic inputs at each location were controlled by the individual collaborators and were best practice for the area.

The actual dates achieved at the five sites were as follows

Location	**Drill Date 1**	**Drill Date 2**	**Drill Date 3**
Kinross	19 August	27 August	11 September
Cirencester	21 August	2 September	14 September
Great Carlton	22 August	4 September	16 September
Dunmow	28 August	4 September	16 September
Otley	21 August	2 September	14 September

At each location two plant populations assessments were made one in the autumn and one post winter.

Two plant vigour assessments were also made at the same time using a 1-9 scale (1 = poor : 9 = good)

RESULTS

ARC - (CIRENCESTER)

An establishment count made on October 26th gave the following plants/m^2 and % establishment.

Seeds/m^2	**Plants/m^2 and % Establishment (26th October)**		
	August 21st	**September 2nd**	**September 14th**
Apex 80	37 (46%)	45 (56%)	42 (52%)
Apex 120	40 (33%)	53 (44%)	32 (27%)
Synergy 80	28 (35%)	33 (41%)	33 (41%)
Synergy 120	28 (23%)	43 (36%)	38 (37%)
Pronto 80	23 (29%)	28 (35%)	47 (59%)
Pronto 120	35 (29%)	40 (33%)	48 (40%)

The Apex and Synergy produced lower % establishment levels as the seed rates were increased from 80 to 120 seeds/m^2 and with both these varieties the middle drilling date, September 2nd, produced the highest plant populations.

Pronto behaved slightly differently giving similar % establishment levels from the two seed rates (except at the third drilling date) but the third drilling dated produced the highest plant populations with this variety.

A second plant population assessment was made on

Seeds/m^2	**Plants/m^2 and % Establishment**		
	August 21st	**September 2nd**	**September 14th**
Apex 80	33.3 (42%)	48.3 (60%)	30.0 (37%)
Apex 120	48.3 (40%)	53.3 (44.1%)	38.3 (32%)
Synergy 80	30.0 (37%)	33.3 (42%)	16.7 (21%)
Synergy 120	33.3 (28%)	48.3 (40%)	33.3 (28%)
Pronto 80	31.7 (40%)	46.7 (58%)	33.3 (42%)
Pronto 120	45.0 (37%)	58.3 (49%)	36.7 (31%)

Plant populations remained low at this location particularly at the third drilling date where the highest population was only 38 plants/m^2.

The total range of plants/m^2 was 17 to 58/m^2.

A vigour assessment conducted at the same time gave the following scores.

Seeds/m^2	**Plants/m^2 and % Establishment**		
	August 21st	**September 2nd**	**September 14th**
Apex 80	5.0	4.3	4.7
Apex 120	5.0	4.3	4.7
Synergy 80	8.0	7.3	7.3
Synergy 120	7.7	7.7	6.7
Pronto 80	7.3	7.7	6.0
Pronto 120	6.3	7.0	6.7

There was only a small decline in vigour at the later drilling date but the conventional variety Apex always demonstrated the lowest vigour.

The plots were harvested on July 27th

Seeds/m^2	Yield (t/ha) at three drilling dates		
	August 21st	September 2nd	September 14th
Apex 80	3.32	3.09	3.27
Apex 120	3.23	3.26	2.63
Synergy 80	3.61	2.65	3.77
Synergy 120	3.45	3.27	3.88
Pronto 80	2.93	3.06	2.78
Pronto 120	3.03	3.00	3.23

CV 9.58%
LSD 0.49 t/ha

The average yields at the three drilling dates were

August 21st - 3.26 t/ha
September 2nd - 3.05 t/ha
September 14th - 3.26 t/ha

The middle drilling date, the one which for Apex and Synergy produced the highest plant populations gave the lower yields.

There was considerable inconsistency in performance between the varieties. At the conventional seed rate for Apex (120 seeds/m^2) the yield was significantly lower at the latest drilling date compared to the two earlier drilling dates. However at 80 seeds/m^2 the yields were similar across all drilling dates.

The variety association Synergy showed a significant yield reduction at the middle drilling dates (80 seeds/m^2) but at 120 seeds/m^2 the third drilling date significantly outyielded the second date.

There were no significant differences in yield between any of the Pronto treatments.

ARC - (GREAT CARLTON)

Plant populations were assessed on October 8th and at this location the middle sowing date again produced the highest plant populations.

Seeds/m^2	Plants/m^2 and % establishment - 8th October		
	August 28th	September 5th	September 16th
Apex 80	22.4 (28%)	58.4 (73%)	49.9 (62%)
Apex 120	53.6 (45%)	70.9 (59%)	76.0 (63%)
Synergy 80	36.3 (45%)	52.5 (66%)	41.9 (52%)
Synergy 120	56.5 (47%)	79.7 (66%)	52.5 (44%)
Pronto 80	46.4 (58%)	51.7 (65%)	50.9 (64%)
Pronto 120	67.5 (56%)	82.4 (69%)	70.7 (59%)

Plant populations ranged from 22/m^2, Apex drilled early at 80 seeds/m^2 up to 82/m^2 from the middle drilling date of Pronto at 120 seeds/m^2.

Pronto produced the highest plant populations overall, and in general the third sowing date produced more plants/m^2 than the first sowing date.

A second plant assessment was made on March 12th

Seeds/m^2	**Plants/m^2 and % establishment - March 12th**		
	August 28th	**September 5th**	**September 16th**
Apex 80	46.9 (59%)	48.8 (61%)	26.9 (34%)
Apex 120	65.6 (55%)	68.0 (57%)	40.5 (34%)
Synergy 80	36.5 (46%)	48.8 (61%)	39.5 (49%)
Synergy 120	47.7 (40%)	61.6 (51%)	47.5 (40%)
Pronto 80	46.1 (58%)	46.1 (58%)	30.9 (39%)
Pronto 120	60.8 (51%)	75.7 (63%)	61.9 (52%)

In this post winter assessment it is clear that the later drilling date suffered more plant loss than the two earlier drilling dates.

The total range of plants/m^2 was 27 to 76/m^2.

The plots were harvested on July 17th.

Seeds/m^2	**Yield (t/ha) from three drilling dates**		
	August 28th	**September 5th**	**September 16th**
Apex 80	3.33	3.55	2.86
Apex 120	3.65	3.79	3.19
Synergy 80	3.84	3.66	3.25
Synergy 120	3.97	3.97	3.25
Pronto 80	3.86	3.84	3.45
Pronto 120	3.84	4.17	3.44

CV 6.92%
LSD 0.42 t/ha

The average yields at the three drilling dates were

August 28th - 3.75 t/ha
September 5th - 3.83 t/ha
September 16th - 3.24 t/ha

The third drilling date was clearly the lowest yielding at this location.

The conventional variety Apex at both seed rates yielded significantly less at the third drilling date than the second or first date.

Synergy at 120 seeds/m^2 yielded significantly less at the third date than the first or second. At the lower seed rate of 80/m^2 only the first drilling date significantly outyielded the third date.

The only significant yield response in Pronto was where the second drilling date (120 seds/m^2) outyielded the third date.

DUNMOW

The plant population assessments were made on October 28th.

Seeds/m^2	Plants/m^2 and % establishment - 28th October		
	August 28th	September 4th	September 16th
Apex 80	42.6 (53%)	83.5 (100%)	55.5 (69%)
Apex 120	61.7 (51%)	102.1 (85%)	67.5 (58%)
Synergy 80	58.2 (73%)	67.9 (85%)	49.3 (62%)
Synergy 120	75.0 (63%)	90.4 (67%)	78.4 (64%)
Pronto 80	61.7 (77%)	79.4 (95%)	57.3 (72%)
Pronto 120	80.4 (67%)	92.8 (77%)	85.7 (71%)

The middle drilling date on September 4th gave the highest establishment levels in every variety. The number of plants/m^2 ranged from 43 to 102 depending upon the different treatments.

A further population assessment was made on March 3rd

Seeds/m^2	Plants/m^2 and % establishment - March 3rd		
	August 28th	September 4th	September 16th
Apex 80	36.2 (45%)	56.0 (70%)	40.9 (51%)
Apex 120	47.1 (39%)	74.6 (62%)	51.5 (43%)
Synergy 80	47.1 (59%)	54.2 (68%)	46.2 (58%)
Synergy 120	64.9 (54%)	59.1 (49%)	63.5 (53%)
Pronto 80	52.4 (65%)	62.2 (78%)	46.6 (58%)
Pronto 120	63.5 (53%0	71.5 (60%)	69.3 (58%)

Plant numbers declined considerably from the earlier assessment with the second drilling date generally providing the highest plant populations.

The range in plant populations was 36 to 76 plants/m^2.

Vigour assessments made on December 1st and March 3rd indicated few differences between varieties or drilling dates.

Seeds/m^2	Plant Vigour Scores					
	August 28th		September 4th		September 16th	
Apex 80	6.0	5.3	7.0	6.3	6.0	5.3
Apex 120	6.7	5.8	7.3	6.7	6.7	5.8
Synergy 80	6.0	6.0	6.3	6.3	6.0	5.3
Synergy 120	6.7	4.7	4.7	4.7	6.0	6.0
Pronto 80	6.0	5.8	6.3	6.0	6.0	5.7
Pronto 120	6.0	6.0	6.0	6.0	7.0	6.0

The plots were harvested on July 23rd.

Seeds/m^2	Yield (t/ha) at three drilling dates		
	August 28th	September 4th	September 16th
Apex 80	2.13	2.67	3.12
Apex 120	2.18	2.59	3.42
Synergy 80	2.70	2.98	3.94
Synergy 120	2.83	3.08	3.77
Pronto 80	2.63	2.72	3.55
Pronto 120	2.79	2.89	3.76

CV 8.31%

LSD 0.40 t/ha

The average yields from the three drilling dates were

August 28th	-	2.54 t/ha
September 4th	-	2.82 t/ha
September 16th	-	3.59 t/ha

The yields increased as the drilling date was later in the season. The highest yields were therefore not clearly associated with the highest plant populations.

The conventional variety Apex gave a significant yield response at both seed rates as each drilling date became later.

Synergy only produced a significant yield moving from drilling date two to three. Pronto also produced the same response as Synergy giving a significant yield response moving from September 4th to September 16th drilling.

MRC (OTLEY)

The varieties Apex, Synergy and Pronto were sown at 80 and 120 seeds/m^2 on 21 August, 2 an 14 September 1998 at MRC Otley. Establishment was rapid for the early sown experiment with 10 mm rain falling on 28 August, 12 days after sowing the crop was at the two true leaf stage. Establishment was progressively slowed by the cool wet conditions in September and the 2 September sowing had not emerged by the time of the last date of sowing on 14 September. By 25 September all plots had emerged but plants in the later two sowings were small and % establishment was poorer in the later sowing.

Plant population levels were assessed on two dates November 19th and March 4th.

Seeds/m^2	**Plants/m^2 and % establishment - November 19th**		
	August 21st	**September 2nd**	**September 14th**
Apex 80	-	65.2 (81%)	47.2 (59%)
Apex 120	-	79.5 (66%)	55.6 (46%)
Synergy 80	-	59.8 (74%)	58.6 (73%)
Synergy 120	-	68.8 (57%)	58.0 (48%)
Pronto 80	-	68.2 (85%)	67.6 (84%)
Pronto 120	-	73.0 (60%)	81.9 (68%)
LSD		14.67	26.18
CV		11.67	23.4

The first drilling date was badly affected by volunteer oilseed rape plants and it was not possible to make accurate plant population assessments. This particular series of plots from the August 21st drilling date were not taken to yield.

A further population assessment was made on March 4th.

Seeds/m^2	**Plants/m^2 and % establishment - March 4th**	
	September 2nd	**September 14th**
Apex 80	50.6 (36%)	39.8 (50%)
Apex 120	65.3 (54%)	43.1 (36%)
Synergy 80	49.5 (62%)	46.6 (58%)
Synergy 120	54.5 (45%)	45.2 (38%)
Pronto 80	53.5 (47%)	56.0 (70%)
Pronto 120	61.7 (51%)	69.3 (58%)
LSD	12.83	21.17
CV	12.63	23.28

The plant establishment levels were all lower at the post winter assessment than the earlier assessment.

The higher seed rates generally produced more plants/m^2 but the total population range across the two seed rates and two drilling dates was only 40 to 69 plants/m^2.

The trials were harvested on July 21st

Seeds/m^2	**Yield (t/ha) at two drilling dates**	
	September 2nd	**September 14th**
Apex 80	4.04	3.74
Apex 120	4.14	3.77
Synergy 80	4.06	3.97
Synergy 120	4.09	3.96
Pronto 80	4.26	3.77
Pronto 120	3.67	3.86
LSD	0.704	0.594
CV	9.58	8.49

The overall yields from the two drilling dates were

September 2nd - 4.04 t/ha
September 14th - 3.84 t/ha

The third drilling date was 5% lower yielding overall than the second drilling date but there were no significant differences in yield at the third drilling date between varieties or seed rates.

At the second drilling date the only significant yield difference was the Pronto at 120 seeds/m^2 which was significantly lower yielding than the 80 seeds/m^2 and also the Apex at 120 seeds/m^2.

SA (KINROSS)

Two establishment assessments were made on October 26th and April 9th

Seeds/m^2	Plants/m^2 and % establishment - October 26th		
	August 20th	September 1st	September 15th
Apex 80	96.1 (120%)	86.5 (108%)	38.0 (47%)
Apex 120	101.7 (85%)	122.7 (102%)	61.8 (51%)
Synergy 80	63.7 (70%)	66.5 (83%)	32.3 (40%)
Synergy 120	91.3 (76%)	96.1 (80%)	44.7 (37%)
Pronto 80	91.3 (114%)	69.4 (87%)	24.7 (31%)
Pronto 120	95.1 (79%)	108.4 (90%)	47.5 (40%)

Some difficulties were experienced in making the plant counts due to volunteer oilseed rape plants but the data clearly shows the poor levels of establishment from the third drilling date.

The second assessment made post winter gave much lower plant population levels.

Seeds/m^2	Plants/m^2 and % establishment - April 9th		
	August 20th	September 1st	September 15th
Apex 80	79.5 (99%)	87.1 (109%)	17.2 (21%)
Apex 120	85.8 (71%)	90.9 (76%)	21.0 (17%)
Synergy 80	70.6 (88%)	78.2 (98%)	17.2 (21%)
Synergy 120	90.3 (75%)	79.5 (66%)	18.5 (15%)
Pronto 80	76.9 (96%)	83.3 (104%)	20.4 (25%)
Pronto 120	88.4 (74%)	81.4 (68%)	22.3 (19%)

The third drilling date did not survive very well after the winter and plant populations were only about 25% of those present at the two earlier drilling dates.

Two vigour assessments made in the spring on February 16th and April 9th gave the following results.

Seeds/m^2	Plant Vigour Scores					
	August 20th		September 1st		September 15th	
Apex 80	7.7	6.0	4.3	5.7	1.0	2.0
Apex 120	8.3	6.3	4.3	5.3	1.3	2.3
Synergy 80	7.3	7.7	4.0	6.0	1.0	2.7
Synergy 120	7.7	8.0	4.0	7.0	1.3	2.7
Pronto 80	7.3	7.3	4.0	6.7	1.0	2.7
Pronto 120	7.7	8.0	4.3	4.7	1.0	2.0
	(Aut)	(Spr)				

The vigour assessments indicated very marked declines in plant vigour moving from the earlier to the latest drilling dates. These differences were clearly illustrated again when the plots were harvested on August 11th.

Seeds/m^2	Yield (t/ha) from the three drilling dates		
	August 20th	**September 1st**	**September 15th**
Apex 80	3.71	3.46	2.24
Apex 120	3.73	3.48	2.28
Synergy 80	4.24	4.06	2.29
Synergy 120	4.30	4.21	2.51
Pronto 80	4.10	4.10	2.48
Pronto 120	4.13	4.13	2.70
CV	6.56%	6.70%	5.99%
LSD	0.49 t/ha	0.48 t/ha	0.26 t/ha

The average yields from the three drilling dates clearly indicate the influence of the third drilling date on crop performance.

August 20th - 4.03 t/ha
September 1st - 3.91 t/ha
September 15th - 2.42 t/ha

Within any drilling date there was no significant difference between the two seed rates of the three varieties.

All three varieties clearly exhibited their lowest yields at the third drilling date but there was little difference between drilling dates one and two.