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Winter Oilseed Rape

Rothamsted Research

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89/R/RA/1

WINTER OILSEED RAPE

FACTORS LIMITING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the growth and yield of w. oilseed rape - Osier.

Sponsors: C.J. Rawlinson, R.J. Darby, P.G.N. Digby, J.E. Leach, I.H. Williams, D.P. Yeoman.

Associate sponsors: P.B. Barraclough, J. Lacey, S.P. McGrath.

Design: A single replicate of 2 x 2 x 2 x 2 x 2 x 2 + 3 replicates of 2 x 6 + 20 extra plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. **SEEDRATE** Seed rates (sown on rows 17 cm apart):

 4 KG
 8 KG

2. **SOW DATE** Dates of sowing:

 17 AUG 17 August, 1988
 7 SEP 7 September

3. **N RATE** Amounts of N fertilizer (kg N), as 'Nitro-Chalk',
 applied on 16 Feb, 1989, and 28 Mar in addition
 to a basal application of 50 kg N as 'Nitram' to
 the seedbed:

 25+25
 50+100

4. **FUNGCIDE** Fungicides:

 NONE None
 SPRAYED Prochloraz at 0.50 kg in 220 l on 8 Nov, 1988, to
 SOW DATE 17 AUG plots only on 21 Mar, 1989 and to
 SOWDATE 7 SEP plots only on 12 Apr. Iprodione at
 0.50 kg in 220 l on 2 June

5. **GROWREG** Growth regulator:

 NONE None
 TRIAPEN Triapenthenol at 0.70 kg in 220 l on 21 Mar, 1989 to
 SOW DATE 17 AUG and on 12 Apr to SOW DATE 7 SEP

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plus four extra plots, sown at 8 kg in rows 17 cm apart, given no nitrogen:

EXTRA NO	Sowing dates and agrochemicals:
17AUG TIF	Sown on 17 August, 1988 given growth regulator, insecticides and fungicides (triplicated)
7SEP O	Sown on 7 September, none

NOTES: (1) The alternative fungicide 'HWG 1608' (proposed common name terbuconazole) was applied at 250 g active ingredient in 220 l on the first occasion and 375 g a.i. in 220 l for the remainder.

(2) Because of errors in spray application two plots were incorrectly treated. These were the combination of **SEEDRA N 8** with **N RATE N 25+25** and one of the plots of **EXTRA NO, 17AUG TIF**. These plots were not used in the analysis.

Basal applications: Manures: 'Nitram' at 140 kg. Weedkillers: TCA at 10 kg in 200 l. Metazachlor at 1.2 kg with fluazifop-p-butyl at 0.19 kg and a wetting agent ('Enhance' at 0.26 l) in 260 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Enhance' at 0.50 l) in 520 l.

Seed: Ariana, dressed gamma HCH, thiram and fenpropimorph.

Cultivations, etc.:- Heavy spring-tine cultivated, rotary cultivated: 9 Aug, 1988. Basal N applied, TCA applied: 16 Aug. Remaining weedkillers applied: 30 Sept. Desiccant with wetting agent applied: 12 July, 1989. Combine harvested **SOW DATE 17 AUG:** 18 July and **SOW DATE 7 SEP:** 20 July. Previous crops: W. wheat 1987, w. barley 1988.

NOTE: Observations were made during the season on diseases, pests, N in plants and soil, dry matter accumulation, leaf areas, light interception and lodging. Glucosinolate and oil contents of grain were measured.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

SEEDRATE	4 KG	8 KG	Mean
SOW DATE			
17 AUG	3.41	3.41	3.41
7 SEP	3.19	3.28	3.23
Mean	3.30	3.34	3.32
N RATE	25+25	50+100	Mean
SOW DATE			
17 AUG	3.55	3.27	3.41
7 SEP	3.28	3.18	3.23
Mean	3.42	3.23	3.32

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GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

N RATE	25+25	50+100	Mean
SEEDRATE			
4 KG	3.38	3.22	3.30
8 KG	3.45	3.23	3.34
Mean	3.42	3.23	3.32
GROWREG	NONE	TRIAPEN	Mean
SOW DATE			
17 AUG	3.26	3.56	3.41
7 SEP	3.23	3.24	3.23
Mean	3.24	3.40	3.32
GROWREG	NONE	TRIAPEN	Mean
SEEDRATE			
4 KG	3.21	3.39	3.30
8 KG	3.28	3.41	3.34
Mean	3.24	3.40	3.32
GROWREG	NONE	TRIAPEN	Mean
N RATE			
25+25	3.33	3.50	3.42
50+100	3.16	3.30	3.23
Mean	3.24	3.40	3.32
INSCTCDE	NONE	DE+MA+TR	Mean
SOW DATE			
17 AUG	3.31	3.50	3.41
7 SEP	3.08	3.39	3.23
Mean	3.20	3.45	3.32
INSCTCDE	NONE	DE+MA+TR	Mean
SEEDRATE			
4 KG	3.21	3.39	3.30
8 KG	3.18	3.50	3.34
Mean	3.20	3.45	3.32
INSCTCDE	NONE	DE+MA+TR	Mean
N RATE			
25+25	3.28	3.55	3.42
50+100	3.11	3.34	3.23
Mean	3.20	3.45	3.32

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GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

INSCTCDE	NONE	DE+MA+TR	Mean
GROWREG			
NONE	3.21	3.28	3.24
TRIAPEN	3.18	3.61	3.40
Mean	3.20	3.45	3.32
FUNGCIDE	NONE	SPRAYED	Mean
SOW DATE			
17 AUG	3.26	3.56	3.41
7 SEP	3.22	3.25	3.23
Mean	3.24	3.40	3.32
FUNGCIDE	NONE	SPRAYED	Mean
SEEDRATE			
4 KG	3.23	3.37	3.30
8 KG	3.25	3.44	3.34
Mean	3.24	3.40	3.32
FUNGCIDE	NONE	SPRAYED	Mean
N RATE			
25+25	3.31	3.52	3.42
50+100	3.17	3.29	3.23
Mean	3.24	3.40	3.32
FUNGCIDE	NONE	SPRAYED	Mean
GROWREG			
NONE	3.17	3.32	3.24
TRIAPEN	3.31	3.49	3.40
Mean	3.24	3.40	3.32
FUNGCIDE	NONE	SPRAYED	Mean
INSCTCDE			
NONE	3.20	3.19	3.20
DE+MA+TR	3.28	3.61	3.45
Mean	3.24	3.40	3.32
SOW DATE	N RATE	25+25	50+100
	SEEDRATE		
17 AUG	4 KG	3.59	3.22
	8 KG	3.50	3.32
7 SEP	4 KG	3.17	3.22
	8 KG	3.40	3.15

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GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

SOW DATE	GROWREG SEEDRATE	NONE	TRIAPEN
17 AUG	4 KG	3.23	3.58
	8 KG	3.29	3.53
7 SEP	4 KG	3.18	3.20
	8 KG	3.27	3.28

SOW DATE	GROWREG N RATE	NONE	TRIAPEN
17 AUG	50	3.46	3.63
	150	3.06	3.48
7 SEP	50	3.20	3.36
	150	3.25	3.12

SEEDRATE	GROWREG N RATE	NONE	TRIAPEN
4 KG	50	3.24	3.52
	150	3.18	3.27
8 KG	50	3.42	3.48
	150	3.14	3.33

SOW DATE	INSCTCDE SEEDRATE	NONE	DE+MA+TR
17 AUG	4 KG	3.35	3.47
	8 KG	3.28	3.54
7 SEP	4 KG	3.08	3.31
	8 KG	3.08	3.47

SOW DATE	INSCTCDE N RATE	NONE	DE+MA+TR
17 AUG	25+25	3.39	3.71
	50+100	3.24	3.30
7 SEP	25+25	3.18	3.39
	50+100	2.98	3.39

SEEDRATE	INSCTCDE N RATE	NONE	DE+MA+TR
4 KG	50	3.30	3.46
	150	3.12	3.32
8 KG	50	3.27	3.64
	150	3.10	3.37

SOW DATE	INSCTCDE GROWREG	NONE	DE+MA+TR
17 AUG	NONE	3.31	3.21
	TRIAPEN	3.32	3.80
7 SEP	NONE	3.11	3.34
	TRIAPEN	3.05	3.43

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GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

SEEDRATE	INSCTCDE	NONE	DE+MA+TR
4 KG	GROWREG		
	NONE	3.25	3.17
8 KG	TRIAPEN	3.18	3.61
	NONE	3.17	3.39
	TRIAPEN	3.19	3.62

N RATE	INSCTCDE	NONE	DE+MA+TR
50	GROWREG		
	NONE	3.29	3.37
150	TRIAPEN	3.28	3.72
	NONE	3.13	3.18
	TRIAPEN	3.09	3.50

SOW DATE	FUNGCIDE	NONE	SPRAYED
17 AUG	SEEDRATE		
	4 KG	3.21	3.61
7 SEP	8 KG	3.31	3.51
	4 KG	3.26	3.13
	8 KG	3.18	3.37

SOW DATE	FUNGCIDE	NONE	SPRAYED
17 AUG	N RATE		
	25+25	3.37	3.73
7 SEP	50+100	3.15	3.39
	25+25	3.25	3.31
	50+100	3.18	3.18

SEEDRATE	FUNGCIDE	NONE	SPRAYED
4 KG	N RATE		
	25+25	3.35	3.41
8 KG	50+100	3.12	3.32
	25+25	3.27	3.63
	50+100	3.22	3.25

SOW DATE	FUNGCIDE	NONE	SPRAYED
17 AUG	GROWREG		
	NONE	3.09	3.44
7 SEP	TRIAPEN	3.43	3.68
	NONE	3.25	3.21
	TRIAPEN	3.19	3.29

SEEDRATE	FUNGCIDE	NONE	SPRAYED
4 KG	GROWREG		
	NONE	3.20	3.21
8 KG	TRIAPEN	3.26	3.52
	NONE	3.13	3.43
	TRIAPEN	3.36	3.46

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GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

	FUNGCIDE	NONE	SPRAYED	
N RATE	GROWREG			
25+25	NONE	3.26	3.41	
	TRIAPEN	3.36	3.63	
50+100	NONE	3.08	3.23	
	TRIAPEN	3.26	3.34	
SOW DATE	FUNGCIDE	NONE	SPRAYED	
	INSCTCDE			
17 AUG	NONE	3.22	3.41	
	DE+MA+TR	3.30	3.71	
7 SEP	NONE	3.18	2.98	
	DE+MA+TR	3.26	3.52	
SEEDRATE	FUNGCIDE	NONE	SPRAYED	
	INSCTCDE			
4 KG	NONE	3.25	3.18	
	DE+MA+TR	3.22	3.56	
8 KG	NONE	3.15	3.21	
	DE+MA+TR	3.34	3.67	
N RATE	FUNGCIDE	NONE	SPRAYED	
	INSCTCDE			
25+25	NONE	3.24	3.33	
	DE+MA+TR	3.38	3.71	
50+100	NONE	3.16	3.06	
	DE+MA+TR	3.17	3.52	
GROWREG	FUNGCIDE	NONE	SPRAYED	
	INSCTCDE			
NONE	NONE	3.18	3.24	
	DE+MA+TR	3.16	3.40	
TRIAPEN	NONE	3.22	3.15	
	DE+MA+TR	3.40	3.83	
SEEDRA N	8 KG	16 KG	Mean	
N RATE N				
0+0	3.40	3.04	3.22	
25+25	3.24	3.21	3.23	
25+75	3.62	3.30	3.46	
50+100	3.10	3.17	3.14	
50+150	3.08	3.16	3.12	
75+175	3.18	3.20	3.19	
Mean	3.27	3.18	3.23	
N RATE P	0+0	75+175	Mean	
	3.22	3.14	3.18	
SULPHUR	0	25	50	Mean
	3.39	3.57	3.41	3.46
FUNG ALT	H 17 AUG	H 7 SEP	Mean	
	3.84	3.67	3.76	

89/R/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

EXTRA NO	17AUG TIF	7SEP O	Mean
	4.22	3.44	3.96

*** Standard errors of differences of means ***

(not including extra plots)

Margin of two factor tables	0.088
Two factor tables	0.124
Three factor tables	0.176

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	19	0.351	10.6

GRAIN MEAN DM% 85.4

PLOT AREA HARVESTED 0.00299

89/W/RA/1

WINTER OILSEED RAPE

HARVESTING AND CROP STRUCTURE

Object: To study the effects of seed rate and growth regulator on the yield and harvest losses of w. oilseed rape - Warren Field I.

Sponsors: R. Moffitt, C.J. Rawlinson.

Design: 3 randomised blocks of 4 plots split into 7 sub-plots.

Whole plot dimensions: 24.0 x 10.0.

Treatments: All combinations of:-

Whole plots

1. **SEEDRATE** Seed rates:

6 KG

16 KG

2. **GROW REG** Growth regulator applied 2 May, 1989:

NONE

None

BAS111

'BAS11106W' at 0.9 l in 250 l

NOTE: Yields and harvest losses were recorded for one sub-plot per plot using a conventional combine harvester. Additional subplots were included to test the performance of the Institute of Engineering Research stripping harvester. Harvest losses from this machine were recorded but not yields.

Basal applications: Manures: Magnesian limestone at 7.5 t. N at 100 kg as 'Nitram' twice. Weedkillers: Fluazifop-p-butyl at 0.19 kg in 220 l. Benazolin at 0.38 kg and clopyralid at 0.06 kg in 220 l. Insecticide: Alphacypermethrin at 0.02 kg in 220 l.

Seed: Ariana.

Cultivations, etc.:- Barley straw burnt: 30 Aug, 1988. Spike harrowed twice with crumbler attached, seed sown, rolled: 5 Sept. Fluazifop-p-butyl applied: 23 Nov. Benazolin and clopyralid applied: 12 Dec. N applied: 8 Mar, 1989 and 19 Apr. Insecticide applied: 27 May. Harvested: 14 Aug. Previous crops: W. barley 1987, s. barley 1988.

89/W/RA/1

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

GROW REG SEEDRATE	NONE	BAS111	Mean
6 KG	2.46	2.80	2.63
16 KG	2.49	2.42	2.45
Mean	2.48	2.61	2.54

*** Standard errors of differences of means ***

SEEDRATE	GROW REG	SEEDRATE GROW REG
0.200	0.200	0.283

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	6	0.346	13.6

GRAIN MEAN DM% 89.2

SUB PLOT AREA HARVESTED 0.00305

89/R/RA/2

WINTER OILSEED RAPE

SEED RATES AND ROW SPACINGS

Object: To study the effects of a range of row-widths and seed rates on the growth and yield of w. oilseed rape - Appletree.

Sponsor: D.P. Yeoman.

Design: 3 randomised blocks of 11 plots.

Whole plot dimensions: 3.0 x 15.0.

Treatments: All combinations of:-

1. **SEEDRATE** Seed rates:

4 KG
6 KG
8 KG

2. **ROWSPACE** Row spacings:

17.5 CM
35 CM
52.5 CM

plus two extra treatments, sown at 2 kg seed rate:-

EXTRA Row spacings:

2 KG 35 35 cm
2 KG 52.5 52.5 cm

Basal applications: Manure: 'Nitram' at 440 kg. Weedkillers: Metazachlor at 1.2 kg with fluzafop-p-butyl at 0.19 kg and a wetting agent ('Enhance' at 0.26 l) in 260 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Agral' at 0.50 l) in 520 l.

Seed: Ariana, dressed gamma HCH, thiram and fenpropimorph.

Cultivations, etc.:- Rotary cultivated: 22 Aug, 1988. Cultivated by rotary grubber: 7 Sept. Rotary harrowed, seed sown: 8 Sept. Weedkillers with wetting agent applied: 30 Sept. N applied: 14 Feb, 1989. Desiccant with wetting agent applied: 11 July. Combine harvested: 18 July. Previous crops: W. wheat 1987, w. barley 1988.

NOTE: Plant counts were made at establishment and in spring.

89/R/RA/2

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

ROWSPACE	17.5 CM	35 CM	52.5 CM	Mean
SEEDRATE				
4 KG	1.54	1.24	1.47	1.42
6 KG	1.65	1.40	1.88	1.64
8 KG	1.41	1.34	1.96	1.57
Mean	1.54	1.33	1.77	1.54
EXTRA	2 KG 35	2 KG 52.5	Mean	
	1.05	1.58	1.32	
GRAND MEAN	1.50			

*** Standard errors of differences of means ***

SEEDRATE	ROWSPACE	SEEDRATE ROWSPACE & EXTRA
0.130	0.130	0.225

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	20	0.276	18.4
GRAIN MEAN DM%	76.4		
PLOT AREA HARVESTED	0.00345		

89/R/RA/3

WINTER OILSEED RAPE

VARIETIES, PESTS AND DISEASES

Object: To investigate the effects of full pest and disease control on a range of low glucosinolate varieties compared with Bienvenu - Osier.

Sponsors: C.J. Rawlinson, I.H. Williams.

Design: 2 randomised blocks of 24 plots.

Whole plot dimensions: 3.0 x 21.0.

Treatments: All combinations of:-

1. **VARIETY** Varieties:

ARIANA	Ariana
BIENVENU	Bienvenu
CAPRCORN	Capricorn
COBRA	Cobra
LIBRAVO	Libravo
TAPIDOR	Tapidor

2. **INSCTCDE** Insecticides:

NONE	None
FULL	Deltamethrin at 6.2 g in 200 l on 1 Oct, 1988, and 7 Nov. Azinphos methyl at 0.40 kg and demeton-S-methyl sulphone at 0.12 kg in 300 l on 29 Mar, 1989. Triazophos at 0.42 kg in 260 l on 2 June.

3. **FUNGCIDE** Fungicides:

NONE	None
FULL	Prochloraz at 0.50 kg in 200 l on 7 Nov, 1988 and 29 Mar, 1989. Iprodione at 0.50 kg in 260 l on 2 June.

Basal applications: Manure: 'Nitram' at 140 kg on two occasions and on a third occasion at 290 kg. Weedkillers: TCA at 10 kg in 200 l. Metazachlor at 1.2 kg with fluazifop-p-butyl at 0.19 kg and a wetting agent ('Enhance' at 0.26 l) in 260 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Enhance' at 0.50 l) in 520 l.

Seed: Varieties, sown at 8.0 kg.

Cultivations, etc.:- Heavy spring-tine cultivated, rotary cultivated: 9 Aug, 1988. First N applied, TCA applied: 16 Aug. Seed sown: 22 Aug. Remaining weedkillers with wetting agent applied: 30 Sept. Second N applied: 2 Mar, 1989. Third N applied: 28 Mar. Desiccant with wetting agent applied: 12 July. Combine harvested: 15 July. Previous crops: W. wheat 1987, w. barley 1988.

89/R/RA/3

NOTE: Disease assessments were made on eight occasions throughout the season and pest numbers were recorded in autumn, spring and summer. Microflora of leaf and pods were assessed until harvest. Glucosinolate contents in plant tissues and grain were measured throughout the season.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

INSCTCDE	NONE	FULL	Mean
VARIETY			
ARIANA	2.71	3.26	2.99
BIENVENU	3.39	3.41	3.40
CAPRCORN	2.87	4.02	3.45
COBRA	2.64	3.46	3.05
LIBRAVO	2.85	3.52	3.18
TAPIDOR	2.70	3.63	3.17

Mean	2.86	3.55	3.21
------	------	------	------

FUNGCIDE	NONE	FULL	Mean
VARIETY			
ARIANA	2.73	3.24	2.99
BIENVENU	3.24	3.56	3.40
CAPRCORN	3.29	3.61	3.45
COBRA	2.95	3.14	3.05
LIBRAVO	3.10	3.27	3.18
TAPIDOR	3.03	3.30	3.17

Mean	3.06	3.35	3.21
------	------	------	------

FUNGCIDE	NONE	FULL	Mean
INSCTCDE			
NONE	2.73	2.99	2.86
FULL	3.38	3.72	3.55

Mean	3.06	3.35	3.21
------	------	------	------

VARIETY	FUNGCIDE	NONE	FULL
ARIANA	INSCTCDE		
	NONE	2.58	2.84
BIENVENU	FULL	2.88	3.65
	NONE	3.36	3.42
CAPRCORN	FULL	3.11	3.70
	NONE	2.54	3.20
COBRA	FULL	4.03	4.01
	NONE	2.58	2.70
LIBRAVO	FULL	3.33	3.59
	NONE	2.78	2.93
TAPIDOR	FULL	3.43	3.61
	NONE	2.54	2.86
	FULL	3.53	3.74

89/R/RA/3

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

*** Standard errors of differences of means ***

VARIETY	INSCTCDE	FUNGCIDE	VARIETY INSCTCDE
0.163	0.094	0.094	0.230
VARIETY FUNGCIDE	INSCTCDE FUNGCIDE	VARIETY INSCTCDE FUNGCIDE	
0.230	0.133	0.325	

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	23	0.325	10.2
GRAIN MEAN DM%	78.0		
PLOT AREA HARVESTED	0.00405		

89/R/RA/4

WINTER OILSEED RAPE

STRAW TREATMENTS BEFORE SOWING

Object: To study the effects of a range of methods of treating cereal straw on the establishment and yield of w. oilseed rape sown on two dates, with and without seedbed N - Appletree.

Sponsors: R.J. Darby, D.P. Yeoman.

Design: 3 randomised blocks of 6 plots split into 2 sub plots each split into 2 sub sub plots.

Whole plot dimensions: 6.0 x 31.0.

Treatments: All combinations of:-

Whole plots

- | | |
|-------------|---|
| 1. STR DISP | Disposal of straw: |
| BURN | Burnt 17 Aug, 1988 |
| CHOP | Chopped 17 Aug |
| BALE | Baled 9 Aug and bales removed |
| 2. CULTIVTN | Method of primary cultivation, on 19 Aug, 1988: |
| TINE CULT | Tine cultivated, without inversion |
| PLOUGH | Ploughed |

Sub plots

- | | |
|-------------|------------------|
| 3. SOW DATE | Dates of sowing: |
| 25 AUG | 25 Aug, 1988 |
| 8 SEPT | 8 Sept |

Sub sub plots

- | | |
|------------|--|
| 4. SDBED N | Seedbed nitrogen (kg N) as 'Nitram' on 23 Aug, 1988: |
| 0 | |
| 50 | |

NOTES: (1) All plots were rotary cultivated on 22 Aug, 1988.
(2) CULTIVTN TINE CULT plots were cultivated twice by rotary grubber and CULTIVTN PLOUGH plots once on 24 Aug.
(3) All plots were rotary harrowed and harrowed before drilling. All plots were harrowed in and rolled after drilling.

Basal applications: Manure: 'Nitram' at 440 kg. Weedkillers: Metazachlor at 1.2 kg with fluazifop-p-butyl at 0.19 kg and a wetting agent ('Enhance' at 0.26 l) in 260 l. Desiccant: Diquat at 0.60 kg ion with a wetting agent ('Agral' at 0.50 l) in 500 l.

Seed: Ariana, dressed gamma HCH, thiram and fenpropimorph, sown at 8.0 kg.

89/R/RA/4

Cultivations, etc.:- Weedkillers with wetting agent applied: 30 Sept, 1988. Basal N applied: 14 Feb, 1989. Desiccant with wetting agent applied: 11 July. Combine harvested: 17 July. Previous crops: W. wheat 1987, w. barley 1988.

NOTE: Emergence counts were made in autumn and plant counts in early March. Percentages of oil in the grain were measured.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

CULTIVTN	TINE	CULT	PLOUGH	Mean
STR DISP				
BURN		1.84	2.16	2.00
CHOP		1.56	2.23	1.90
BALE		2.32	2.39	2.36
Mean		1.91	2.26	2.08
SOW DATE 25 AUG 8 SEPT Mean				
STR DISP				
BURN		1.75	2.24	2.00
CHOP		1.77	2.02	1.90
BALE		2.16	2.55	2.36
Mean		1.90	2.27	2.08
SOW DATE 25 AUG 8 SEPT Mean				
CULTIVTN				
TINE	CULT	1.91	1.91	1.91
	PLOUGH	1.89	2.63	2.26
Mean		1.90	2.27	2.08
SDBED N 0 50 Mean				
STR DISP				
BURN		1.86	2.13	2.00
CHOP		1.83	1.97	1.90
BALE		2.27	2.44	2.36
Mean		1.99	2.18	2.08
SDBED N 0 50 Mean				
CULTIVTN				
TINE	CULT	1.83	1.99	1.91
	PLOUGH	2.15	2.37	2.26
Mean		1.99	2.18	2.08
SDBED N 0 50 Mean				
SOW DATE				
	25 AUG	1.78	2.01	1.90
	8 SEPT	2.19	2.35	2.27
Mean		1.99	2.18	2.08

89/R/RA/4

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

		SOW DATE	25 AUG	8 SEPT		
STR DISP	CULTIVTN					
BURN	TINE CULT		1.73	1.94		
	PLOUGH		1.76	2.55		
CHOP	TINE CULT		1.66	1.47		
	PLOUGH		1.89	2.57		
BALE	TINE CULT		2.32	2.32		
	PLOUGH		2.01	2.78		
		SDBED N	0	50		
STR DISP	CULTIVTN					
BURN	TINE CULT		1.68	1.99		
	PLOUGH		2.04	2.27		
CHOP	TINE CULT		1.53	1.60		
	PLOUGH		2.13	2.34		
BALE	TINE CULT		2.27	2.37		
	PLOUGH		2.27	2.52		
		SDBED N	0	50		
STR DISP	SOW DATE					
BURN	25 AUG		1.70	1.80		
	8 SEPT		2.02	2.46		
CHOP	25 AUG		1.57	1.98		
	8 SEPT		2.08	1.95		
BALE	25 AUG		2.07	2.26		
	8 SEPT		2.47	2.63		
		SDBED N	0	50		
CULTIVTN	SOW DATE					
TINE CULT	25 AUG		1.76	2.05		
	8 SEPT		1.89	1.92		
PLOUGH	25 AUG		1.80	1.97		
	8 SEPT		2.49	2.77		
		SDBED N	0	50		
STR DISP	CULTIVTN	SOW DATE				
BURN	TINE CULT	25 AUG	1.58	1.88		
		8 SEPT	1.77	2.10		
	PLOUGH	25 AUG	1.82	1.71		
		8 SEPT	2.27	2.83		
CHOP	TINE CULT	25 AUG	1.44	1.88		
		8 SEPT	1.61	1.32		
	PLOUGH	25 AUG	1.70	2.09		
		8 SEPT	2.56	2.58		
BALE	TINE CULT	25 AUG	2.25	2.40		
		8 SEPT	2.29	2.34		
	PLOUGH	25 AUG	1.88	2.13		
		8 SEPT	2.65	2.91		

89/R/RA/4

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

*** Standard errors of differences of means ***

	STR DISP	CULTIVTN	SOW DATE	SDBED N
	0.216	0.176	0.072	0.071
	STR DISP	STR DISP	CULTIVTN	STR DISP
	CULTIVTN	SOW DATE	SOW DATE	SDBED N
	0.306	0.234	0.191	0.233
Except when comparing means with the same level(s) of				
STR DISP		0.125		0.122
CULTIVTN			0.102	
	CULTIVTN	SOW DATE	STR DISP	STR DISP
	SDBED N	SDBED N	CULTIVTN	CULTIVTN
			SOW DATE	SDBED N
	0.190	0.101	0.330	0.329
Except when comparing means with the same level(s) of				
CULTIVTN	0.100			
SOW DATE		0.100		
STR DISP.CULTIVTN			0.177	0.173
	STR DISP	CULTIVTN	STR DISP	
	SOW DATE	SOW DATE	CULTIVTN	
	SDBED N	SDBED N	SOW DATE	
			SDBED N	
	0.264	0.215	0.373	
Except when comparing means with the same level(s) of				
STR DISP	0.175			
CULTIVTN		0.143		
STR DISP.CULTIVTN			0.248	
STR DISP.SOW DATE	0.173			
CULTIVTN.SOW DATE		0.141		
STR DISP.CULTIVTN.SDBED N			0.244	

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	10	0.374	18.0
BLOCK.WP.SP	12	0.217	10.4
BLOCK.WP.SP.SSP	24	0.299	14.4

GRAIN MEAN DM% 72.7

PLOT AREA HARVESTED 0.00345

89/R/RA/5

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

SEEDRATE	8	16	Mean
SOWING			
OVERS BA	1.83	1.79	1.81
OVERS CH	0.91	1.41	1.16
CONVEN S	1.04	1.33	1.18
Mean	1.26	1.51	1.38

N RATE	0	50	Mean
SOWING			
OVERS BA	1.53	2.09	1.81
OVERS CH	0.68	1.64	1.16
CONVEN S	0.92	1.45	1.18
Mean	1.04	1.73	1.38

N RATE	0	50	Mean
SEEDRATE			
8	1.06	1.46	1.26
16	1.02	1.99	1.51
Mean	1.04	1.73	1.38

	N RATE	0	50
SOWING SEEDRATE			
OVERS BA	8	1.64	2.02
	16	1.43	2.16
OVERS CH	8	0.72	1.09
	16	0.63	2.19
CONVEN S	8	0.82	1.27
	16	1.01	1.64

*** Standard errors of differences of means ***

	SOWING	SEEDRATE	N RATE	SOWING SEEDRATE
	0.220	0.179	0.200	0.310
	SOWING N RATE	SEEDRATE N RATE	SOWING SEEDRATE N RATE	
	0.329	0.268	0.465	

Except when comparing means with the same level(s) of

SOWING	0.346		
SEEDRATE		0.283	
SOWING. SEEDRATE			0.489

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP	10	0.380	27.5
BLOCK.WP.SP	12	0.599	43.3

GRAIN MEAN DM% 90.8 SUB PLOT AREA HARVESTED 0.00345

89/R/RA/10

WINTER OILSEED RAPE

TIMES AND METHODS OF HARVEST

Object: To investigate the effects of fungicide and times and methods of harvest on the yield and glucosinolate content of the seed - Appletree and Drapers.

Sponsors: C.J. Rawlinson, G.F.J. Milford, A. Porter, J. Fieldsend.

Design: 4 blocks of 2 whole plots each split into 3 sub-plots each split into 3 sub-sub-plots. Two blocks were sited in Appletree and 2 in Drapers.

Whole plot dimensions: 78.0 x 14.0 Appletree.
24.0 x 64.0 Drapers.

Treatments: All combinations of:-

Whole plots

1. **FUNGICIDE** Fungicide at stem extension:
NONE None
PROCHLOR Prochloraz at 0.50 kg in 200 l on 5 May, 1989

Sub plots

2. **HAR METH** Method of harvest:
DIRECT No pre-harvest treatment
DESICATE Desiccated with diquat before combining
SWATHE Swathed before combining

Sub sub plots

3. **HAR TIME** Time of harvest:
EARLY
NORMAL
LATE

NOTES: (1) **HAR METH DESICATE** plots were desiccated with diquat at 0.60 kg ion in 520 l. For **HAR TIME EARLY** and **NORMAL** the wetting agent 'Agral' (at 0.50 l) was added and these were desiccated on 29 June, 1989 and 12 July respectively. **HAR TIME LATE** plots had the wetting agent 'Enhance' (at 0.52 l) added and these were desiccated on 24 July.
(2) **HAR METH SWATHE** plots were swathed on the same dates for each **HAR TIME** that desiccation was done.
(3) Combine harvesting dates were:

HAR METH	HAR TIME:		
	EARLY	NORMAL	LATE
DIRECT	24 July	24 July	31 July
DESICATE	12 July	19 July	31 July
SWATHE	12 July	19 July	31 July

89/R/RA/10

Standard applications:

Appletree: Manure: 'Nitram' at 440 kg. Weedkillers: Metazachlor at 1.2 kg with fluazifop-p-butyl at 0.19 kg and a wetting agent ('Enhance' at 0.26 l) in 260 l.

Drapers: Manure: 'Nitram' at 720 kg. Weedkillers: Clopyralid at 0.07 kg and propyzamide at 0.70 kg in 300 l.

Seed: Ariana, dressed gamma HCH, thiram and fenpropimorph, sown at 8.0 kg.

Cultivations, etc.:-

Appletree: Rotary cultivated: 22 Aug, 1988. Cultivated with rotary grubber: 7 Sept. Rotary harrowed: 8 Sept. Seed sown: 9 Sept. Weedkillers with wetting agent applied: 30 Sept. N applied: 14 Feb, 1989. Previous crops: W. wheat 1987, w. barley 1988.

Drapers: Heavy spring-tine cultivated: 31 Aug, 1988. Rotary cultivated: 5 Sept. Seed sown: 10 Sept. Weedkillers applied: 19 Oct. N applied: 15 Feb, 1989. Previous crops: W. oilseed rape 1987, w. wheat 1988.

NOTE: Seed samples were taken frequently from June until harvest for glucosinolate analysis. Disease assessments (Drapers only) were made at 600, 800, 1000 and 1200 accumulated day degrees centigrade from the onset of flowering.

GRAIN (AT 90% DRY MATTER) TONNES/HECTARE

***** Tables of means *****

HAR METH FUNGICIDE	DIRECT	DESICATE	SWATHE	Mean
NONE	2.83	2.46	2.19	2.50
PROCHLOR	2.69	1.85	2.15	2.23
Mean	2.76	2.16	2.17	2.36
HAR TIME FUNGICIDE	EARLY	NORMAL	LATE	Mean
NONE	2.46	2.43	2.60	2.50
PROCHLOR	2.21	2.15	2.33	2.23
Mean	2.33	2.29	2.47	2.36
HAR TIME HAR METH	EARLY	NORMAL	LATE	Mean
DIRECT	2.87	2.67	2.75	2.76
DESICATE	1.85	2.09	2.54	2.16
SWATHE	2.28	2.12	2.11	2.17
Mean	2.33	2.29	2.47	2.36

89/R/RA/10

GRAIN (AT 90% DRY MATTER) TONNES/HECTRE

***** Tables of means *****

FUNGCIDE	HAR TIME HAR METH	EARLY	NORMAL	LATE
NONE	DIRECT	2.90	2.76	2.85
	DESICATE	2.17	2.36	2.85
	SWATHE	2.30	2.17	2.10
PROCHLOR	DIRECT	2.85	2.58	2.66
	DESICATE	1.53	1.81	2.22
	SWATHE	2.27	2.07	2.12

*** Standard errors of differences of means ***

HAR METH	HAR TIME	FUNGCIDE* HAR METH
0.206	0.082	0.292
FUNGCIDE* HAR TIME	HAR METH HAR TIME	FUNGCIDE* HAR METH HAR TIME
0.116	0.237	0.335

Except when comparing means with the same level(s) of
HAR METH 0.142
FUNGCIDE.HAR METH 0.201

* within the same level of FUNGCIDE only

***** Stratum standard errors and coefficients of variation *****

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	12	0.413	17.5
BLOCK.WP.SP.SSP	36	0.284	12.0

GRAIN MEAN DM% 84.2

SUB PLOT AREA HARVESTED	HAR METH SWATHE	0.00518
	OTHER HAR METH	0.00322