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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. **FUNGICIDE** 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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6. **INSCTCDE** Insecticides:

NONE	None
DE+MA+TR	Deltamethrin at 62 g in 220 l on 4 Oct, 1988 and 11 Nov Malathion at 1.3 kg in 220 l on 12 Apr, 1989 Triazophos at 0.42 kg in 220 l on 5 June

plus three replicates of all combinations of the following (sown later in rows 17 cm apart and given seedbed nitrogen, growth regulator, insecticides and fungicides):

1. **SEEDRA N** Seed rate:

8 KG
16 KG

2. **N RATE N** Amounts of N fertilizer (kg N) as divided applications on 16 Feb and 28 Mar:

0+0
25+25
25+75
50+100
50+150
75+175

plus three replicates of two extra treatments (sown later at 16 kg in rows 12 cm apart and given seedbed nitrogen, growth regulator, insecticides and fungicides):

N RATE P Amounts of N fertilizer as divided applications on 16 Feb and 28 Mar (kg N):

0+0
75+175

plus two replicates of three extra treatments (sown later, at 8 kg in rows 17 cm apart and given 50+100 kg N, growth regulator, insecticides and fungicides and oxamyl at 5 kg to the seedbed)

SULPHUR Rates of sulphur (kg S) as calcium sulphate, applied on 28 Mar, 1989:

0
25
50

plus two replicates of two extra treatments, sown at 8 kg in rows 17 cm apart and given 50+100 kg N and insecticides:

FUNG ALT Alternative fungicides 'HWG 1608' applied on three occasions:

H 17 AUG	Sown on 17 August, 1988, fungicide on 8 Nov, 21 Mar, 1989 and 2 June
H 7 SEP	Sown on 7 September, 1988, fungicide on 8 Nov, 13 Apr, 1989 and 2 June

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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 *****

	GROWREG	NONE	TRIAPEN
SOW DATE	SEEDRATE		
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

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

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

	INSCTCDE	NONE	DE+MA+TR
SOW DATE	SEEDRATE		
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

	INSCTCDE	NONE	DE+MA+TR
SOW DATE	N RATE		
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

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

	INSCTCDE	NONE	DE+MA+TR
SOW DATE	GROWREG		
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 *****

	INSCTCDE	NONE	DE+MA+TR
SEEDRATE	GROWREG		
4 KG	NONE	3.25	3.17
	TRIAPEN	3.18	3.61
8 KG	NONE	3.17	3.39
	TRIAPEN	3.19	3.62
N RATE	INSCTCDE	NONE	DE+MA+TR
	GROWREG		
50	NONE	3.29	3.37
	TRIAPEN	3.28	3.72
150	NONE	3.13	3.18
	TRIAPEN	3.09	3.50
SOW DATE	FUNGCIDE	NONE	SPRAYED
	SEEDRATE		
17 AUG	4 KG	3.21	3.61
	8 KG	3.31	3.51
7 SEP	4 KG	3.26	3.13
	8 KG	3.18	3.37
SOW DATE	FUNGCIDE	NONE	SPRAYED
	N RATE		
17 AUG	25+25	3.37	3.73
	50+100	3.15	3.39
7 SEP	25+25	3.25	3.31
	50+100	3.18	3.18
SEEDRATE	FUNGCIDE	NONE	SPRAYED
	N RATE		
4 KG	25+25	3.35	3.41
	50+100	3.12	3.32
8 KG	25+25	3.27	3.63
	50+100	3.22	3.25
SOW DATE	FUNGCIDE	NONE	SPRAYED
	GROWREG		
17 AUG	NONE	3.09	3.44
	TRIAPEN	3.43	3.68
7 SEP	NONE	3.25	3.21
	TRIAPEN	3.19	3.29
SEEDRATE	FUNGCIDE	NONE	SPRAYED
	GROWREG		
4 KG	NONE	3.20	3.21
	TRIAPEN	3.26	3.52
8 KG	NONE	3.13	3.43
	TRIAPEN	3.36	3.46

89/R/RA/1

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
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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: Magnesians 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 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 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. **INSECTCIDE** 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. **FUNGICIDE** 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
	INSCTCDE		
ARIANA	NONE	2.58	2.84
	FULL	2.88	3.65
BIENVENU	NONE	3.36	3.42
	FULL	3.11	3.70
CAPRCORN	NONE	2.54	3.20
	FULL	4.03	4.01
COBRA	NONE	2.58	2.70
	FULL	3.33	3.59
LIBRAVO	NONE	2.78	2.93
	FULL	3.43	3.61
TAPIDOR	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

WINTER OILSEED RAPE

OVERSOWING IN WHEAT

Object: To study the establishment of rape after s. wheat by oversowing into the wheat - Summerdells II.

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

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

Whole plot dimensions: 8.0 x 15.0.

Treatments: All combinations of:-

Whole plots

1. **SOWING** Methods of sowing and straw disposal:

OVERS BA	Oversown on 7 Sept, 1988, straw baled on 9 Sept and bales removed
OVERS CH	Oversown on 7 Sept, straw chopped and spread on 9 Sept
CONVEN S	Straw baled on 9 Sept and bales removed, conventionally sown into conventionally prepared seedbed
2. **SEEDRATE** Seed rate (kg):

8	
16	

Sub plots

- | | |
|---------------|--|
| N RATE | Nitrogen fertilizer as 'Nitram': |
| 0 | None |
| 50 | 50 kg N to seedbed (post-sowing to OVERS BA and OVERS CH) on 13 Sept, 1988 |

NOTES: (1) Oversowing was done into standing s. wheat. The wheat was harvested the next day.
(2) SOWING CONVEN S plots were cultivated by rotary grubber on 12 Sept, 1988, rotary harrowed and the seed sown on 14 Sept.

Basal applications: Manures: 'Nitram' at 580 kg. Weedkillers: Metazachlor at 1.2 kg with fluazifop-p-butyl at 0.19 kg 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.:- Weedkillers applied: 17 Oct, 1988. Basal N applied: 14 Feb, 1989. Desiccant with wetting agent applied: 11 July. Combine harvested: 20 July. Previous crops: W. barley 1987, s. wheat 1988.

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

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	SEEDRATE	SOWING	
	N RATE	N RATE	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