

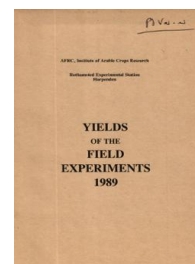
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## Yields of the Field Experiments 1989

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### 89/R/RA/1 Factors Limiting Yield - W. 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:

<b>EXTRA NO</b>	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 \*\*\*\*\*

<b>SEEDRATE</b>	4 KG	8 KG	Mean
<b>SOW DATE</b>			
17 AUG	3.41	3.41	3.41
7 SEP	3.19	3.28	3.23
Mean	3.30	3.34	3.32
<b>N RATE</b>	25+25	50+100	Mean
<b>SOW DATE</b>			
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 \*\*\*\*\*

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

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

	<b>INSCTCDE</b>	NONE	DE+MA+TR
<b>SEEDRATE</b>	<b>GROWREG</b>		
4 KG	NONE	3.25	3.17
	TRIAPEN	3.18	3.61
8 KG	NONE	3.17	3.39
	TRIAPEN	3.19	3.62
	<b>INSCTCDE</b>	NONE	DE+MA+TR
<b>N RATE</b>	<b>GROWREG</b>		
50	NONE	3.29	3.37
	TRIAPEN	3.28	3.72
150	NONE	3.13	3.18
	TRIAPEN	3.09	3.50
	<b>FUNGCIDE</b>	NONE	SPRAYED
<b>SOW DATE</b>	<b>SEEDRATE</b>		
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
	<b>FUNGCIDE</b>	NONE	SPRAYED
<b>SOW DATE</b>	<b>N RATE</b>		
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
	<b>FUNGCIDE</b>	NONE	SPRAYED
<b>SEEDRATE</b>	<b>N RATE</b>		
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
	<b>FUNGCIDE</b>	NONE	SPRAYED
<b>SOW DATE</b>	<b>GROWREG</b>		
17 AUG	NONE	3.09	3.44
	TRIAPEN	3.43	3.68
7 SEP	NONE	3.25	3.21
	TRIAPEN	3.19	3.29
	<b>FUNGCIDE</b>	NONE	SPRAYED
<b>SEEDRATE</b>	<b>GROWREG</b>		
4 KG	NONE	3.20	3.21
	TRIAPEN	3.26	3.52
8 KG	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	
<b>N RATE</b>	<b>GROWREG</b>			
25+25	NONE	3.26	3.41	
	TRIAPEN	3.36	3.63	
50+100	NONE	3.08	3.23	
	TRIAPEN	3.26	3.34	
<b>SOW DATE</b>	<b>FUNGCIDE</b>	<b>NONE</b>	<b>SPRAYED</b>	
	<b>INSCTCDE</b>			
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	
<b>SEEDRATE</b>	<b>FUNGCIDE</b>	<b>NONE</b>	<b>SPRAYED</b>	
	<b>INSCTCDE</b>			
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	
<b>N RATE</b>	<b>FUNGCIDE</b>	<b>NONE</b>	<b>SPRAYED</b>	
	<b>INSCTCDE</b>			
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	
<b>GROWREG</b>	<b>FUNGCIDE</b>	<b>NONE</b>	<b>SPRAYED</b>	
	<b>INSCTCDE</b>			
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	
<b>SEEDRA N</b>	8 KG	16 KG	Mean	
<b>N RATE N</b>				
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	
<b>N RATE P</b>	0+0	75+175	Mean	
	3.22	3.14	3.18	
<b>SULPHUR</b>	0	25	50	Mean
	3.39	3.57	3.41	3.46
<b>FUNG ALT</b>	H 17 AUG	H 7 SEP	Mean	
	3.84	3.67	3.76	

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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