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# Yields of the Field Experiments 1988



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# **Mixed Crops**

# **Rothamsted Research**

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## 88/R/M/1 and 88/W/M/1

#### MIXED 1

#### INPUTS FOR WINTER CEREALS

Object: To compare amounts of disease and the yield of triticale with those of w. wheat, w. barley and w. rye on two contrasted sites each given contrasted amounts of agrochemicals - Rothamsted Highfield VI (R) Woburn Far Field II (W).

Sponsors: R.J. Gutteridge, D. Hornby, R.D. Prew (R), P.R. Scott,
W. Hollins, R.L. Gregory (I.P.S.R., Cambridge).

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 3.0 x 10.0 (R), 4.0 x 10.0 (W).

Treatments: All combinations of :-

1. CROP VAR	Crop and variety:	(R)	(W)
B PANDA	W. barley, Panda sown at	200 kg,	200 kg
R DOMINT	W. rye, Dominant sown at	120 kg,	140 kg
- T LASKO	W. triticale, Lasko sown at	180 kg,	180 kg
T STATUS	W. triticale, Status sown at	130 kg,	140 kg
- W AVALON	W. wheat, Avalon sown at	180 kg,	190 kg
2. INPUT	Inputs of agrochemicals, in addit	ion to bas	als:
LARGE	High input, 40 kg N early plus 16 (W).	00 kg N lat	er (R) and
	Prochloraz + carbendazim + tridem (W).	norph (Apri	1) (R) and
	Fenpropimorph + chlorothalonil (M	May) (R)	
	Propiconazole + tridemorph (May)	(W)	
	Propiconazole + carbendazim (June	e) (W)	
SMALL	Low input, 120 kg N in early Apri summer insecticides.	il. No fun	gicides or

## NOTES: (1) Treatments were applied as follows:

Highfield (R): N treatments: 23 Feb, 1988 and 5 Apr.

Prochloraz at 0.40 kg, carbendazim at 0.15 kg with

tridemorph at 0.52 kg in 220 l: 26 Apr. Fenpropimorph

at 0.75 kg with clorothalonil at 1.0 kg in 220 l: 25 May.

Far Field II (W): N treatments: 3 Mar, 1988 and 13 Apr.

Prochloraz at 0.40 kg, carbendazim at 0.15 kg with

tridemorph at 0.52 kg in 220 l: 26 Apr. Propiconazole

at 0.12 kg and tridemorph at 0.25 kg in 220 l: 23 May.

Propiconazole at 0.12 kg with carbendazim at 0.15 kg:

18 June.

(2) The R DOMINT and the T STATUS plots at Rothamsted failed and were cultivated and fallowed in early May 1988.

#### 88/R/M/1 and 88/W/M/1

#### Basal applications:

Highfield VI (R): Manures: Chalk at 5.0 t. Weedkillers: Glyphosate at 0.27 kg in 200 l. Diclofop-methyl at 0.95 kg in 200 l. Fluroxypyr at 0.20 kg with metsulfuron-methyl at 0.006 kg in 200 l. Insecticide: Fonofos at 1.4 kg in 200 l. Far Field II (W): Weedkillers: Isoxaben at 0.12 kg in 200 l. Diclofop-methyl at 0.57 kg in 200 l. Insecticide: Fonofos at

#### Cultivations, etc.:-

1.4 kg in 200 1.

Highfield VI (R): Chalk applied: 16 Sept, 1987. Glyphosate applied: 29 Sept. Ploughed: 2 Oct. Rotary harrowed: 5 Oct. Rotary harrowed, seed sown, harrowed: 6 Oct. Diclofop-methyl applied: 18 Nov. Insecticide applied: 14 Jan, 1988. Fluroxypyr and metsulfuron-methyl applied: 25 Apr. Combine harvested: 4 Aug (barley), 23 Aug (wheat), 26 Aug (triticale). Previous crops: W. wheat 1986 and 1987.

Far Field II (W): Ploughed: 21 Sept, 1987. Rotary cultivated with crumbler attached, seed sown: 1 Oct. Harrowed and rolled: 2 Oct. Isoxaben applied: 23 Oct. Diclofop-methyl applied: 24 Oct. Insecticide applied: 12 Jan, 1988. Combine harvested: 3 Aug (barley) 25 Aug (other cereals). Previous crops: W. wheat 1986 and 1987.

# 88/R/M/1 W.BARLEY, W.TRITICALE, W.WHEAT

#### GRAIN TONNES/HECTARE

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

INPUT CROP VAR	LARGE	SMALL	Mean
B PANDA	8.40	6.44	7.42
T LASKO	8.27	6.18	7.22
W AVALON	6.88	5.87	6.37
Mean	7.85	6.16	7.01

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

CROP VAR	INPUT	CROP VAR
		INPUT
0.458	0.374	0.647

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

Stratum	d.f.	s.e.	CV%
BLOCK.WP	10	0.793	11.3

GRAIN MEAN DM% 81.9

PLOT AREA HARVESTED 0.00272

# 88/W/M/1 W.BARLEY, W.TRITICALE, W.WHEAT

#### GRAIN TONNES/HECTARE

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

INPUT	LARGE	SMALL	Mean
CROP VAR			
B PANDA	6.99	4.52	5.76
R DOMINT	8.15	7.09	7.62
T LASKO	3.90	3.80	3.85
T STATUS	5.22	2.95	4.09
W AVALON	4.26	2.77	3.52
Mean	5.71	4.23	4.97

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

CROP VAR	INPUT	CROP VAR
		INPUT
0.354	0.224	0.500

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

 Stratum
 d.f.
 s.e.
 cv%

 BLOCK.WP
 18
 0.613
 12.3

GRAIN MEAN DM% 81.3

PLOT AREA HARVESTED 0.00271

#### MIXED 5

#### COMPARISON OF COMBINES

Object: To evaluate the suitability of two combines for plot work in respect of purity of sample and accuracy when working on slopes - Great Knott II.

Sponsors: R. Moffitt, M.N. Rogers.

Design: A systematic split-plot design of 56 whole plots arranged as shown below.

W B B В B Top of slope W W W W W W W W W W W W W W W в в B B В B B W W W W W W W W W W W W W W B W В Bottom of slope

\* Combines started here (after harvesting a dummy wheat plot downhill), worked up the column of plots then down the next column etc.

B = Barley W = wheat

NOTES: (1) Each whole plot was systematically divided to compare the two combine harvesters.

(2) There were 10 m headlands between contiguous barley and wheat plots. These were removed before combining the plots. There were 1 m paths between contiguous wheat plots.

Whole plot dimensions: 9.0 x 11.0.

#### Treatments:

Whole plots

1. CROP Crop:

WHEAT W. wheat BARLEY S. barley

2. DIRECTN Combine direction in relation to slope:

UP Up slope DOWN Down slope

3. ORDER Order of combining:

BEGIN First plot in column
STRAIGHT Central plots in column
END Last plot in column

Sub plots

4. COMBINE

Combine type:

CLAYSON DEUTZ-F Clayson 1530 Deutz-Fahr 660

NOTE: Spring barley replaced autumn-sown rye which failed.

Basal applications: Manures: Chalk at 5.0 t. 'Nitram' at 120 kg and
later at 250 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l.
Glyphosate at 0.36 kg in 200 l (to failed rye plots only).
Fluroxypyr at 0.15 kg with clopyralid at 0.05 kg and bromoxynil at
0.24 kg in 200 l. Fungicide: Propiconazole at 0.12 kg in 200 l.

Seed: W. wheat: Mission, sown at 200 kg.
W. rye: Dominant, sown at 200 kg.

S. barley: Klaxon, sown at 180 kg.

Cultivations, etc.:- Ploughed: 12 Aug, 1987. Disced: 17 Aug. Chalk applied: 16 Sept. Paraquat applied: 28 Oct. Rotary harrowed, w. wheat and w. rye seed sown: 18 Nov. First N applied: 2 Mar, 1988. Glyphosate applied (to rye plots): 19 Apr. Second N applied: 22 Apr. Ex-rye plots heavy spring-tine cultivated, rotary harrowed, s. barley seed sown: 29 Apr. Remaining weedkillers applied: 13 May. Fungicide applied: 27 May. Combine harvested: 5 Sept (CLAYSON plots) and 6 Sept (DEUTZ-F plots). Previous crops: W. barley 1986, w. oilseed rape 1987.

#### GRAIN TONNES/HECTARE

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

COMBINE CLAYSON DEUTZ-F 5.77 5.33

	DIRECTN	UP			DOWN		
CROP	ORDER	BEGIN	STRAIGHT	END	BEGIN	STRAIGHT	END
WHEAT		5.45	6.38	6.48		6.67	
BARLEY			3.07		3.70	3.41	3.41
CROP	DIRECTN	ORDER	COMBINE	CLAYSON	DEUTZ-F		
WHEAT	UP	BEGIN		6.10	4.79		
		STRAIGHT		6.87	5.88		
		END		6.87	6.09		
	DOWN	STRAIGHT		7.00	6.34		
BARLEY	UP	STRAIGHT		2.52	3.62		
	DOWN	BEGIN		3.53	3.87		
		STRAIGHT		3.10	3.73		
		END		3.19	3.63		

Grand mean 5.55

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

COMBINE	CROP		CROP		
	DIRECTN	D	IRECTN		
	ORDER		ORDER		
		C	OMBINE		
0.082	0.375		0.434	min.rep	
	0.297		0.343	max-min	
	0.188		0.217	max.rep	
Except when compa	ring means	with	the sa	ame level(s)	of
CROP.DIRECTN.ORD	ER		0.307	min.rep	
			0.242	max-min	
			0.153	max.rep	

max.rep CROP WHEAT and ORDER STRAIGHT

min.rep any of the remainder

 $\mbox{\tt max-min}$   $\mbox{\tt CROP}$  WHEAT and  $\mbox{\tt ORDER}$  STRAIGHT  $\mbox{\tt v}$  any of the remainder

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

Stratum	d.f.	s.e.	CV%
WP	48	0.531	9.6
WP.SP	48	0.434	7.8

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED CLAYSON 0.00310 DEUTZ F 0.00230

#### MIXED 6

#### FACTORS AFFECTING EYESPOT

Object: To study eyespot (Pseudocercosporella herpotrichoides)

development after inoculation with different pathotypes in relation

to host crop and seed rate - Great Knott II.

Sponsors: A. Goulds, B.D.L. Fitt.

Design: 2 randomised blocks of 12 plots split into 4.

Whole plot dimensions:  $3.0 \times 37.0$ .

Treatments: All combinations of:-

Whole plots

W CEREAL Winter cereals sown on 30 October, 1987:

BARLEY Winter barley cv. Opera WHEAT Winter wheat cv. Avalon

2. SEEDRATE Seed rates (seeds per square metre):

NORMAL Normal - 300 barley, 400 wheat HALF N Half normal - 150 barley, 200 wheat

3. INOCULUM Inoculation with different eyespot pathogen types:

NONE None
RYE INOC Rye type
WHE INOC Wheat type

Sub plots

4. FUNGTIME Times of applying prochloraz at 0.40 kg and carbendazim at 0.15 kg in 220 l:

NONE None

EARLY Sprayed at growth stage 30/31 on 26 Apr, 1988

LATE Sprayed at growth stage, 33/37 wheat, 41/49 barley on

20 May

NOTES: (1) One additional sub-plot in each whole plot was systematically arranged for sampling, yields not taken.

(2) Strains of wheat and rye type inoculum were colonised on oat seed and broadcast within two weeks of emergence.

Basal applications: Manures: Chalk at 5.0 t. 'Nitram' at 120 kg and
later at 250 kg. Weedkillers: Paraquat at 0.60 kg ion in 200 l.
Fluroxypyr at 0.20 kg with clopyralid at 0.07 kg and bromoxynil at
0.34 kg with the tridemorph in 200 l. Fungicides: Tridemorph at
0.52 kg. Chlorothalonil at 1.0 kg in 200 l.

Cultivations, etc.:- Ploughed: 12 Aug, 1987. Disced: 17 Aug. Chalk applied: 16 Sept. Paraquat applied: 28 Oct. Rotary harrowed, seed sown: 30 Oct. First N applied: 2 Mar, 1988. Second N applied 22 Apr. Remaining weedkillers with tridemorph applied: 10 May. Chlorothalonil applied: 6 June. Combine harvested: 4 Aug (barley), 22 Aug (wheat). Previous crops: W. barley 1986, w. oilseed rape 1987.

NOTE: Eyespot was assessed on plants at weekly intervals from early March until early August.

#### GRAIN TONNES/HECTARE

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

SEEDRATE	NORMAL	HALF N	Mean	
W CEREAL				
BARLEY	6.93	6.58	6.76	
WHEAT	8.96	8.26	8.61	
Mean	7.94	7.42	7.68	
INOCULUM	NONE	RYE INOC	WHE INOC	Mean
W CEREAL	6.74	6 01	6 71	6 76
BARLEY		6.81	6.71	6.76
WHEAT	8.62	8.55	8.66	8.61
Mean	7.68	7.68	7.69	7.68
INOCULUM SEEDRATE	NONE	RYE INOC	WHE INOC	Mean
NORMAL	7.97	8.04	7.82	7.94
HALF N	7.39	7.32	7.55	7.42
Mean	7.68	7.68	7.69	7.68
FUNGTIME	NONE	EARLY	LATE	Mean
W CEREAL				
BARLEY	6.62	6.82	6.82	6.76
WHEAT	8.42	8.64	8.76	8.61
Mean	7.52	7.73	7.79	7.68
FUNGTIME	NONE	EARLY	LATE	Mean
SEEDRATE	7.78	0 00	0.04	7 04
NORMAL		8.02	8.04	7.94
HALF N	7.27	7.45	7.55	7.42
Mean	7.52	7.73	7.79	7.68
FUNGTIME	NONE	EARLY	LATE	Mean
INOCULUM				
NONE	7.61	7.73	7.70	7.68
RYE INOC	7.43	7.80	7.82	7.68
WHE INOC	7.53	7.66	7.87	7.69
Mean	7.52	7.73	7.79	7.68

# GRAIN TONNES/HECTARE

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

	TWOOTITIES	NONE DV	E TNOC WHE	TNOC	
	INOCULUM	NONE KI	E INOC WHE	INOC	
W CEREAL	SEEDRATE	C 07	7.03	6.78	
BARLEY	NORMAL	6.97		6.65	
	HALF N	6.52 8.97	9.05	8.86	
WHEAT	NORMAL		8.05	8.46	
	HALF N	8.26	8.05	0.40	
	FUNGTIME	NONE	EARLY	LATE	
W CEREAL	SEEDRATE				
BARLEY	NORMAL	6.78	7.06	6.93	
DARABLE	HALF N	6.46	6.57	6.72	
WHEAT	NORMAL	8.77	8.97	9.15	
HILLII	HALF N	8.08	8.32	8.38	
	FUNGTIME	NONE	EARLY	LATE	
W CEREAL	INOCULUM		6 70	6.88	
BARLEY	NONE	6.64	6.72	6.89	
	RYE INOC	6.57	6.98	6.71	
	WHE INOC	6.67	6.76	8.52	
WHEAT	NONE	8.58	8.75 8.62	8.75	
	RYE INOC	8.29		9.02	
	WHE INOC	8.39	8.56	9.02	
	FUNGTIME	NONE	EARLY	LATE	
SEEDRATE	INOCULUM				
NORMAL	NONE	7.75	8.09	8.07	
	RYE INOC	7.91	8.06	8.16	
	WHE INOC	7.67	7.89	7.89	
HALF N	NONE	7.47	7.37	7.32	
	RYE INOC	6.95	7.54	7.48	
	WHE INOC	7.39	7.43	7.84	
		FUNGTIME	NONE	EARLY	LATE
M CEDENT	SEEDRATE	INOCULUM		211112	
BARLEY		NONE		7.11	7.04
DARLEI	NOMINA	RYE INOC			6.97
		WHE INOC			6.79
	HALF N	NONE		6.32	6.71
	HALL N	RYE INOC			6.81
		WHE INOC		6.65	6.63
MUEAG	NORMAL	NONE			9.11
WHEAT	NORMAL	RYE INOC			9.34
		WHE INOC			9.00
	HALF N	NONE			7.94
	UATE IN	RYE INOC			8.15
		WHE INOC			
		WHE INOC	0.11	0.21	5.05

#### GRAIN TONNES/HECTARE

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

	W C	EREAL	SEI	EDRATE	INOCULUM		FUNGTIME
		0.090		0.090	0.110		0.086
	W CI	EREAL	W	CEREAL	SEEDRATE		W CEREAL
	SEEI	DRATE	INC	CULUM	INOCULUM		FUNGTIME
		0.127		0.156	0.156		0.134
Except when	comparing	means	with	the same	level(s)	of	
W CEREAL							0.122
	SEE	DRATE	INC	OCULUM	W CEREAL		W CEREAL
	FUN	GTIME	FUI	NGTIME	SEEDRATE		SEEDRATE
					INOCULUM		FUNGTIME
		0.134		0.164	0.220		0.190
Except when	comparing	means	with	the same	level(s)	of	
SEEDRATE		0.122					
INOCULUM				0.150			
W CEREAL.SI	EEDRATE						0.173

W CEREAL INOCULUM FUNGTIME	INOCULUM SE FUNGTIME IN	CEREAL EDRATE OCULUM
0.233	0.233	0.329
Except when comparing means W CEREAL.INOCULUM 0.212	with the same le	vel(s) of
CEEDDAME THOCHTIM	0 212	

W CEREAL.SEEDRATE.INOCULUM

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

0.299

d.f. Stratum s.e. CV% 11 0.220 2.9 BLOCK.WP BLOCK.WP.SP 24 0.299 3.9

GRAIN MEAN DM% 80.5

SUB PLOT AREA HARVESTED 0.00235