ROTHAMSTED RESEARCH

Yields of the Field Experiments 1987

Full Table of Content

Mixed Crops

Rothamsted Research

Rothamsted Research (1988) *Mixed Crops ;* Yields Of The Field Experiments 1987, pp 268 - 278 **- DOI: https://doi.org/10.23637/ERADOC-1-37**

87/R/M/1 and 87/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 Summerdells I (R), Woburn Great Hill II (W).

Sponsors: R.J. Gutteridge, D. Hornby, R.D. Prew (R), P.R. Scott, W. Hollins, R.L. Gregory (P.B.I., 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	230 kg,	230 kg
R DOMINT	W. rye, Dominant sown at	170 kg,	170 kg
T LASKO	W. triticale, Lasko sown at	170 kg,	160 kg
T CWT	W. triticale, CWT/1977/290 sown at	180 kg,	170 kg
W AVALON	W. wheat, Avalon sown at	190 kg,	190 kg

2. INPUT — Inputs of agrochemicals, in addition to basals:

LARGE

(R): Manures: N at 40 kg: 11 Feb, 1987, and at 160 kg: 2 Apr, both as 'Nitro-Chalk'. Fungicides: Prochloraz at 0.40 kg, carbendazim at 0.15 kg, tridemorph at 0.52 kg in 220 l: 8 May. Carbendazim at 0.25 kg, maneb at 1.6 kg with propiconazole at 0.12 kg in 220 l: 2 July. Growth regulators: Mepiquat chloride at 0.61 kg with 2-chloroethylphosphonic acid at 0.31 kg in 220 l to barley, chlormequat at 1.1 kg in 220 l to wheat and triticale: 8 May.

(W): Manures: N at 40 kg: 13 Feb, 1987 and at 160 kg: 31 Mar, both as 'Nitram'. Fungicides: Prochloraz at 0.40 kg, carbendazim at 0.15 kg, tridemorph at 0.52 kg in 240 l: 21 Apr. Propiconazole at 0.12 kg, tridemorph at 0.52 kg in 200 l: 27 May. Propiconazole at 0.12 kg, carbendazim at 0.25 kg in 200 l: 29 June. Growth regulators: Mepiquat chloride at 0.53 kg with 2-chloroethylphosphonic acid at 0.27 kg in 200 l, to barley and triticale: 7 May.

SMALL

(R) Manures: 120 kg N as 'Nitro-Chalk': 2 Apr, 1987.
(W) Manures: 160 kg N as 'Nitram': 31 Mar.

https://doi.org/10.23637/ERADOC-1-37

87/R/M/1 and 87/W/M/1

Basal applications:
Summerdells (R): Manures: Chalk at 5.0 t. Weedkillers: Paraquat at 0.60 kg ion in 200 l. Methabenzthiazuron at 1.6 kg in 200 l. Isoproturon at 2.5 kg with bromoxynil and ioxynil (as 'Deloxil' at 2.0 l) in 380 l to barley only. Diclofop-methyl at 1.1 kg with bromoxynil and ioxynil (as 'Deloxil' at 2.0 l) in 380 l to rye, triticale and wheat.
Great Hill II (W): Weedkillers: Bromoxynil and ioxynil (as 'Deloxil' at 2.0 l) in 240 l. Fluroxypyr at 0.20 kg in 400 l to barley and wheat.

Cultivations, etc.:-
Summerdells (R): Heavy spring-tine cultivated and disced: 19 Aug, 1986. Chalk applied: 4 Sept. Paraquat applied: 11 Sept. Spring-tine cultivated, rotary harrowed, seed sown, harrowed: 24 Sept. Rolled: 27 Sept. Methabenzthiazuron applied: 30 Sept. Isoproturon, bromoxynil and ioxynil applied to barley, diclofop-methyl, bromoxynil and ioxynil applied to rye, triticale and wheat: 17 Apr, 1987. Combine harvested barley: 7 Aug, rye, triticale and wheat: 1 Sept. Previous crops: W. wheat 1985, w. barley 1986.
Great Hill II (W): Ploughed, rolled: 20 Sept, 1986. Rotary harrowed with crumbler attached, seed sown: 25 Sept. Bromoxynil and ioxynil applied: 17 Apr, 1987. Fluroxypyr applied to barley and wheat: 23 Apr. Combine harvested barley: 5 Aug, rye, triticale and wheat: 18 Aug. Previous crops: Lucerne 1985, w. wheat 1986.

NOTES: (1) Soil samples were taken for take-all bioassay before sowing and after harvest.
(2) Assessments were made of foot and root rots and foliar diseases during the season.

https://doi.org/10.23637/ERADOC-1-37

87/R/M/1

GRAIN TONNES/HECTARE

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

INPUT CROP VAR	LARGE	SMALL	Mean
B PANDA	6.59	6.46	6.53
R DOMINT	6.54	6.04	6.29
T LASKO	5.74	4.62	5.18
T CWT	6.02	5.81	5.91
W AVALON	6.66	6.17	6.42
Mean	6.31	5.82	6.06

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

Table	CROP VAR	INPUT	CROP VAR INPUT
s.e.d.	0.270	0.170	0.381

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.467	7.7

GRAIN MEAN DM% 85.0

PLOT AREA HARVESTED 0.00274

https://doi.org/10.23637/ERADOC-1-37

87/W/M/1

GRAIN TONNES/HECTARE

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

INPUT / CROP VAR	LARGE	SMALL	Mean
B PANDA	6.56	6.16	6.36
R DOMINT	6.39	5.66	6.02
T LASKO	4.42	3.79	4.11
T CWT	4.57	4.70	4.64
W AVALON	4.72	3.70	4.21
Mean	5.33	4.80	5.07

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

Table	CROP VAR	INPUT	CROP VAR INPUT
s.e.d.	0.396	0.251	0.560

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	18	0.686	13.5

GRAIN MEAN DM% 80.1

PLOT AREA HARVESTED 0.00275

https://doi.org/10.23637/ERADOC-1-37

87/R/M/2

MIXED 2

FACTORS AFFECTING EYESPOT

Object: To study eyespot (Pseudocercosporella herpotrichoides) development after inoculation with different pathotypes in relation to host crop and seed rate - White Horse II.

Sponsor: A. Goulds.

Design: 2 blocks of 12 plots split into 3.

Whole plot dimensions: 3.0 x 37.0.

Treatments: All combinations of:-

Whole plots

1. W CEREAL		Winter cereals sown on 30 September, 1986:
	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 23 Apr, 1987
	LATE	Sprayed at growth stage, 33/37 wheat, 41/49 barley on 19 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: 'Nitram' at 350 kg. Weedkillers: Isoproturon at 2.5 kg with clopyralid at 0.07 kg and bromoxynil at 0.34 kg and mecoprop at 2.5 kg in 200 l. Fungicides: Propiconazole at 0.25 kg with tridemorph at 0.19 kg in 200 l.

Cultivations, etc.:- Heavy spring-tine cultivated twice, disced: 29 Sept, 1986. Rotary harrowed, seed sown: 30 Sept. Weedkillers applied: 15 Apr, 1987. N applied: 17 Apr. Basal fungicides applied: 29 June. Combine harvested: 7 Aug (barley), 1 Sept (wheat). Previous crops: W oats 1985, potatoes 1986.

https://doi.org/10.23637/ERADOC-1-37

87/R/M/2

NOTE: Eyespot was assessed on plants at fortnightly intervals from December to G.S. 30 and weekly thereafter.

GRAIN TONNES/HECTARE

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

SEEDRATE	NORMAL	HALF N	Mean
W CEREAL			
BARLEY	7.74	7.67	7.71
WHEAT	7.98	7.85	7.92
Mean	7.86	7.76	7.81

INOCULUM	NONE	RYE INOC	WHE INOC	Mean
W CEREAL				
BARLEY	7.97	7.74	7.41	7.71
WHEAT	7.94	8.03	7.77	7.92
Mean	7.95	7.89	7.59	7.81

INOCULUM	NONE	RYE INOC	WHE INOC	Mean
SEEDRATE				
NORMAL	8.09	7.91	7.57	7.86
HALF N	7.81	7.87	7.61	7.76
Mean	7.95	7.89	7.59	7.81

FUNGTIME	NONE	EARLY	LATE	Mean
W CEREAL				
BARLEY	7.18	8.06	7.88	7.71
WHEAT	7.56	7.95	8.23	7.92
Mean	7.37	8.00	8.05	7.81

FUNGTIME	NONE	EARLY	LATE	Mean
SEEDRATE				
NORMAL	7.32	8.08	8.18	7.86
HALF N	7.43	7.93	7.92	7.76
Mean	7.37	8.00	8.05	7.81

FUNGTIME	NONE	EARLY	LATE	Mean
INOCULUM				
NONE	7.47	8.22	8.17	7.95
RYE INOC	7.72	7.78	8.16	7.89
WHE INOC	6.92	8.02	7.82	7.59
Mean	7.37	8.00	8.05	7.81

	INOCULUM	NONE	RYE INOC	WHE INOC
W CEREAL	SEEDRATE			
BARLEY	NORMAL	8.15	7.83	7.24
	HALF N	7.78	7.65	7.58
WHEAT	NORMAL	8.04	7.98	7.91
	HALF N	7.85	8.08	7.63

https://doi.org/10.23637/ERADOC-1-37 *pp 7*

87/R/M/2

GRAIN TONNES/HECTARE

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

W CEREAL	FUNGTIME / SEEDRATE	NONE	EARLY	LATE
BARLEY	NORMAL	7.03	8.17	8.02
	HALF N	7.33	7.95	7.73
WHEAT	NORMAL	7.60	7.98	8.35
	HALF N	7.53	7.92	8.12

W CEREAL	FUNGTIME / INOCULUM	NONE	EARLY	LATE
BARLEY	NONE	7.54	8.18	8.17
	RYE INOC	7.45	7.99	7.79
	WHE INOC	6.55	8.02	7.66
WHEAT	NONE	7.40	8.25	8.18
	RYE INOC	8.00	7.57	8.53
	WHE INOC	7.29	8.03	7.99

SEEDRATE	FUNGTIME / INOCULUM	NONE	EARLY	LATE
NORMAL	NONE	7.56	8.36	8.36
	RYE INOC	7.77	7.74	8.22
	WHE INOC	6.62	8.13	7.97
HALF N	NONE	7.39	8.07	7.99
	RYE INOC	7.68	7.82	8.10
	WHE INOC	7.23	7.91	7.68

W CEREAL	SEEDRATE	FUNGTIME / INOCULUM	NONE	EARLY	LATE
BARLEY	NORMAL	NONE	7.74	8.39	8.33
		RYE INOC	7.52	8.03	7.96
		WHE INOC	5.84	8.11	7.78
	HALF N	NONE	7.34	7.97	8.02
		RYE INOC	7.39	7.95	7.63
		WHE INOC	7.27	7.93	7.54
WHEAT	NORMAL	NONE	7.38	8.34	8.39
		RYE INOC	8.02	7.45	8.49
		WHE INOC	7.40	8.16	8.17
	HALF N	NONE	7.43	8.17	7.96
		RYE INOC	7.98	7.69	8.58
		WHE INOC	7.19	7.89	7.81

https://doi.org/10.23637/ERADOC-1-37

87/R/M/2

GRAIN TONNES/HECTARE

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

Table	W CEREAL	SEEDRATE	INOCULUM	FUNGTIME
s.e.d.	0.093	0.093	0.114	0.114

Table	W CEREAL SEEDRATE	W CEREAL INOCULUM	SEEDRATE INOCULUM	W CEREAL FUNGTIME
s.e.d.	0.132	0.162	0.162	0.162

Table	SEEDRATE FUNGTIME	INOCULUM FUNGTIME	W CEREAL SEEDRATE INOCULUM	W CEREAL SEEDRATE FUNGTIME
s.e.d.	0.162	0.198	0.229	0.228

Table	W CEREAL INOCULUM FUNGTIME	SEEDRATE INOCULUM FUNGTIME	W CEREAL SEEDRATE INOCULUM FUNGTIME
s.e.d.	0.280	0.280	0.396

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	11	0.229	2.9
BLOCK.WP.SP	24	0.396	5.1

GRAIN MEAN DM% 84.3

SUB PLOT AREA HARVESTED 0.00235

https://doi.org/10.23637/ERADOC-1-37

87/W/M/2

MIXED 2

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 Hill III.

Sponsor: R. Moffitt.

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

R	W	R	W	R	W	R	W	Top of slope
W	W	W	W	W	W	W	W	
W	W	W	W	W	W	W	W	
R	R	R	R	R	R	R	R	
W	W	W	W	W	W	W	W	
W	W	W	W	W	W	W	W	
R*	W	R	W	R	W	R	W	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.

R = Rye W = wheat

NOTES: (1) Each whole plot was systematically divided to compare the two combine harvesters.
(2) There were 10 m headlands between contiguous rye and wheat plots. These were removed before combining the plots. There were 1 m paths between contiguous wheat plots.

Whole plot dimensions: 8.0 x 11.0.

Treatments:

Whole plots

1. CROP — Crop and variety:

WHEAT	W. wheat, Avalon
RYE	W. rye, Dominant

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

https://doi.org/10.23637/ERADOC-1-37 *pp 10*

87/W/M/2

Sub plots

4. COMBINE Combine type:

CLAYSON	Clayson 1530
DEUTZ-F	Deutz-Fahr 660

Basal applications: Manures: FYM at 100 t. (0:18:36) at 700 kg, 'Nitram' at 470 kg. Weedkillers: Bromoxynil and ioxynil (as 'Deloxil' at 2.0 l) in 240 l. Fungicide: Triadimenol at 0.062 kg in 200 l.

Seed: W. rye: Dominant, sown at 170 kg.
W. wheat: Avalon, sown at 160 kg.

Cultivations, etc.:- FYM applied: 3 July, 1986. Ploughed: 9-11, July. Rolled: 22 July. PK applied: 16 Sept. Rotary harrowed with crumbler attached, sown: 7 Oct. Rolled: 8 Oct. N applied: 15 Apr, 1987. Weedkillers applied: 17 June. Fungicide applied: 1 July. Combine harvested: 15 Sept. Previous crops: Lucerne 1985 and 1986.

https://doi.org/10.23637/ERADOC-1-37 *pp 11*

87/W/M/2

GRAIN TONNES/HECTARE

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

COMBINE	CLAYSON	DEUTZ-F
	5.63	5.78

	DIRECTN	UP			DOWN		
CROP	ORDER	BEGIN	STRAIGHT	END	BEGIN	STRAIGHT	END
WHEAT			6.40		5.49	6.58	6.67
RYE		3.94	3.65	4.25		3.93	

CROP	DIRECTN	ORDER	COMBINE	CLAYSON	DEUTZ-F
WHEAT	UP	STRAIGHT		6.24	6.55
	DOWN	BEGIN		5.57	5.41
		STRAIGHT		6.46	6.70
		END		6.55	6.78
RYE	UP	BEGIN		4.49	3.39
		STRAIGHT		3.76	3.54
		END		3.80	4.70
	DOWN	STRAIGHT		3.78	4.09

Grand mean 5.70

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

Table	COMBINE	CROP DIRECTN ORDER	CROP DIRECTN ORDER COMBINE	
s.e.d.	0.066	0.242	0.299	min.rep
		0.191	0.236	max-min
		0.121	0.149	max.rep
Except when comparing means with the same level(s) of CROP.DIRECTN.ORDER			0.249	min.rep
			0.197	max-min
			0.124	max.rep

max.rep CROP WHEAT and ORDER STRAIGHT
min.rep any of the remainder
max-min CROP WHEAT and ORDER STRAIGHT v any of the remainder

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

Stratum	d.f.	s.e.	cv%
WP	48	0.342	6.0
WP.SP	48	0.352	6.2

GRAIN MEAN DM% 82.0

PLOT AREA HARVESTED	CLAYSON	0.00302
	DEUTZ-F	0.00220

https://doi.org/10.23637/ERADOC-1-37