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Mixed Crops

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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 addition to basals:		
LARGE	High input, 40 kg N early plus 160 kg N later (R) and (W). Prochloraz + carbendazim + tridemorph (April) (R) and (W). Fenpropimorph + chlorothalonil (May) (R) Propiconazole + tridemorph (May) (W) Propiconazole + carbendazim (June) (W)		
SMALL	Low input, 120 kg N in early April. No fungicides or summer insecticides.		

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 chlorothalonil 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 1.4 kg in 200 l.

Cultivations, etc.:-

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

88/R/M/5

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	W	B	W	B	W	B	Top of slope
W	W	W	W	W	W	W	W	
W	W	W	W	W	W	W	W	
B	B	B	B	B	B	B	B	
W	W	W	W	W	W	W	W	
W	W	W	W	W	W	W	W	
W*	B	W	B	W	B	W	B	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

88/R/M/5

Sub plots

4. COMBINE	Combine type:
CLAYSON	Clayson 1530
DEUTZ-F	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. Discd: 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.

88/R/M/5

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	DIRECTN
	ORDER	ORDER
		COMBINE
0.082	0.375	0.434 min.rep
	0.297	0.343 max-min
	0.188	0.217 max.rep
Except when comparing means with the same level(s) of		
CROP.DIRECTN.ORDER		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

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	0.531	9.6
WP.SP	48	0.434	7.8

GRAIN MEAN DM% 84.0

PLOT AREA HARVESTED	CLAYSON	0.00310
	DEUTZ F	0.00230

88/R/M/6

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 x 37.0.

Treatments: All combinations of:-

Whole plots

- | | |
|-------------|--|
| 1. 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.

88/R/M/6

Cultivations, etc.:- Ploughed: 12 Aug, 1987. Discd: 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				
BARLEY	6.74	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	NONE	RYE INOC	WHE INOC	Mean
SEEDRATE				
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				
NORMAL	7.78	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

88/R/M/6

GRAIN TONNES/HECTARE

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

		INOCULUM	NONE	RYE INOC	WHE INOC
W CEREAL	SEEDRATE				
BARLEY	NORMAL		6.97	7.03	6.78
	HALF N		6.52	6.59	6.65
	NORMAL		8.97	9.05	8.86
	HALF N		8.26	8.05	8.46
		FUNGTIME	NONE	EARLY	LATE
W CEREAL	SEEDRATE				
BARLEY	NORMAL		6.78	7.06	6.93
	HALF N		6.46	6.57	6.72
	NORMAL		8.77	8.97	9.15
	HALF N		8.08	8.32	8.38
		FUNGTIME	NONE	EARLY	LATE
W CEREAL	INOCULUM				
BARLEY	NONE		6.64	6.72	6.88
	RYE INOC		6.57	6.98	6.89
	WHE INOC		6.67	6.76	6.71
	NONE		8.58	8.75	8.52
WHEAT	RYE INOC		8.29	8.62	8.75
	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
	NONE		7.47	7.37	7.32
HALF N	RYE INOC		6.95	7.54	7.48
	WHE INOC		7.39	7.43	7.84
		FUNGTIME	NONE	EARLY	LATE
W CEREAL	SEEDRATE	INOCULUM			
BARLEY	NORMAL	NONE	6.76	7.11	7.04
		RYE INOC	6.93	7.21	6.97
		WHE INOC	6.67	6.88	6.79
	HALF N	NONE	6.51	6.32	6.71
		RYE INOC	6.21	6.75	6.81
		WHE INOC	6.67	6.65	6.63
	WHEAT	NONE	8.74	9.08	9.11
		RYE INOC	8.90	8.91	9.34
		WHE INOC	8.68	8.91	9.00
	HALF N	NONE	8.43	8.42	7.94
		RYE INOC	7.68	8.33	8.15
		WHE INOC	8.11	8.21	9.05

88/R/M/6

GRAIN TONNES/HECTARE

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

W CEREAL	SEEDRATE	INOCULUM	FUNGTIME
0.090	0.090	0.110	0.086
W CEREAL	W CEREAL	SEEDRATE	W CEREAL
SEEDRATE	INOCULUM	INOCULUM	FUNGTIME
0.127	0.156	0.156	0.134

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

0.122

SEEDRATE	INOCULUM	W CEREAL	W CEREAL
FUNGTIME	FUNGTIME	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. SEEDRATE

0.173

W CEREAL	SEEDRATE	W CEREAL
INOCULUM	INOCULUM	SEEDRATE
FUNGTIME	FUNGTIME	INOCULUM
		FUNGTIME
0.233	0.233	0.329

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

W CEREAL. INOCULUM

0.212

SEEDRATE. INOCULUM

0.212

W CEREAL. SEEDRATE. INOCULUM

0.299

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

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

GRAIN MEAN DM% 80.5

SUB PLOT AREA HARVESTED 0.00235