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Annuals - Winter Wheat and Barley

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95/R/WW/1

WINTER WHEAT

PREDICTION OF WEED COMPETITION

Object: To predict the yield response of winter wheat to competition from three contrasting weed species - Stackyard.

Sponsors: J.W. Cussans, P.J.W. Lutman.

Design: 3 randomised blocks of 3 x 6 plots.

Whole plot dimensions: 3.0 x 8.0.

Treatments: All combinations of:-

1. WEED SP	Weed species:		
SM	<i>Stellaria media</i> (chickweed)		
AM	<i>Alopecurus myosuroides</i> (black-grass)		
GA	<i>Galium aparine</i> (cleavers)		
2. WEED DEN	Weed density, plants per m ² :		
	SM	AM	GA
0	0	0	0
2	65	130	9
4	80	233	8
8	151	264	22
16	245	434	29
32	301	607	47

NOTE: Target weed densities, plants per m²: SM, AM: 0, 40, 80, 160, 320 and 640, GA: 0, 3, 6, 12, 24 and 48.

Experimental diary:

- 02-Sep-94 : B : PK as (0:20:32) at 1317 kg.
07-Sep-94 : B : Ploughed and furrow pressed.
30-Sep-94 : B : Rotary harrowed.
 : T : Weed seeds sown by hand.
 : B : Rotary harrowed, Mercia, dressed Rappor, drilled
 at 275 seeds per m².
21-Nov-94 : B : Draza at 5.5 kg.
13-Jan-95 : T : WEED SP SM, GA (except WEED DEN 0): Cheetah R at 2.5 l
 in 220 l.
 : T : WEED DEN 0: Stefes IPU at 3.0 l with Stomp 400 at 3.3 l
 in 220 l.
 : T : WEED SP AM (except WEED DEN 0): Oxytril CM at 1.5 l with
 Starane 2 at 0.75 l in 220 l.
14-Mar-95 : B : 34.5% N at 118 kg.
21-Mar-95 : T : WEED SP GA (except WEED DEN 0): Isoproturon 500 at 3.0 l
 in 220 l.
 : T : WEED DEN 0: Ally at 30 g with Cheetah R at 2.5 l and
 Starane 2 at 0.75 l in 220 l.
19-Apr-95 : B : 34.5% N at 463 kg.

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Experimental diary:

05-May-95 : B : Calixin at 0.35 l with Halo at 2.0 l in 200 l.
 20-Jun-95 : B : Silvacur at 1.0 l in 200 l.
 04-Aug-95 : B : Hand harvested.

Previous crops: S. rape 1993, w. oats 1994.

NOTE: Weeds were counted in autumn and spring. Weeds and crop were sampled monthly for dry weight, green area and height, crop also had tillers and leaves per plant counted. Soil was sampled for nitrogen content in February. Flag leaf area and nutrient content were assessed in June. Black-grass seed produced was measured in June. Components of yield were assessed after harvest.

GRAIN TONNES/HECTARE

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

WEED DEN	0	2	4	8	16	32	Mean
WEED SP							
SM	7.92	5.97	6.62	5.63	4.59	5.32	6.01
AM	8.37	3.48	2.90	3.20	2.49	2.65	3.85
GA	8.34	7.17	6.95	7.21	5.87	4.96	6.75
Mean	8.21	5.54	5.49	5.35	4.31	4.31	5.53

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

WEED SP	WEED DEN	WEED SP WEED DEN
0.221	0.313	0.543

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	34	0.664	12.0

GRAIN MEAN DM% 91.2

PLOT AREA HARVESTED 0.00020

95/W/WW/1

WINTER WHEAT

VARIETY, SULPHUR AND NITROGEN

Object: To measure yield and quality response to sulphur fertilizer on two varieties of wheat - Woburn, Great Hill II/III.

Sponsors: S.P. McGrath, F. Zhao.

Design: 3 blocks of (2 x 6) + 6 plots

Plot dimensions: 3.0 x 10.0.

Treatments: All combinations of:-

1. **NITROGEN** Nitrogen fertilizer (kg N) as 27% N at GS 32 in addition to a basal dressing of 180 kg N:

N1	None
N2	50

2. **SULPHUR** Sulphur fertilizer (kg S) as gypsum (17.5% S) at GS 23:

S0	0
S1	20
S2	40
S3	60
S4	80
S5	100

plus 6 extra plots

3. **EXTRA** Variety, timing (growth stage (GS)) and rates of nitrogen fertilizer as urea (kg N), sulphur as ammonium sulphate or gypsum (kg S):

	Variety	N as urea	S as (NH ₄) ₂ SO ₄	S as gypsum	Timing (GS)
EUS0	Hereward	50.0	0	0	65
EUS1	Hereward	32.5	20	0	65
EUS2	Hereward	17.0	40	0	65
EUS3	Hereward	32.5	20	20	65 (gypsum at GS 23)
RNS0	Riband	0	0	0	-
RNS2	Riband	0	0	40	23

NOTE: All treatments were sown to variety Hereward, except RNS0 and RNS2 which were sown to Riband.

Experimental diary:

24-Sep-94 : B : Ploughed.
29-Sep-94 : B : Rolled.
30-Sep-94 : B : Rotary harrowed.

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Experimental diary:

05-Oct-94 : T : Hereward and Riband, dressed Cerevax, drilled at 300 seeds m².
01-Dec-94 : B : Panther at 2.0 l with Fastac at 100 ml in 200 l.
09-Mar-95 : T : Sulphur treatments applied as gypsum.
09-Mar-95 : B : 27% N at 148 kg.
21-Apr-95 : B : 34.5% N at 406 kg.
28-Apr-95 : B : Halo at 2.0 l in 200 l.
04-May-95 : T : **NITROGEN** N2: 27% N at 185 kg.
02-Jun-95 : B : Cyclone at 1.0 l with Mallard at 0.5 l in 300 l.
30-Jun-95 : B : Pirimicarb 50 DG at 280 g in 300 l.
02-Jul-95 : T : **EXTRA** EUS0, EUS1, EUS2, EUS3: Half of ammonium sulphate and urea treatments applied.
10-Jul-95 : T : **EXTRA** EUS0, EUS1, EUS2, EUS3: Half of ammonium sulphate and urea treatments applied.
08-Aug-95 : B : Combine harvested.

- NOTES:** (1) Samples of grain and straw were taken for chemical analysis and grain was tested for baking quality. Sequential crop samples were taken from April to August to measure sulphur content. Soil was also sampled for sulphur content.
(2) One plot with treatment **EXTRA** EUS2 was badly damaged by rabbits. An estimated value was used in the analysis.

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GRAIN TONNES/HECTARE

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

SULPHUR	S0	S1	S2	S3	S4	S5	Mean
NITROGEN							
N1	3.85	4.73	4.40	4.54	3.86	4.83	4.37
N2	3.59	4.43	4.71	4.55	3.97	5.03	4.38
Mean	3.72	4.58	4.56	4.55	3.92	4.93	4.38
EXTRA	EUS0	EUS1	EUS2	EUS3	RNS0	RNS2	Mean
	4.80	4.56	4.12	4.40	4.89	5.29	4.68

Grand mean 4.48

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

SULPHUR	NITROGEN	SULPHUR NITROGEN & EXTRA
0.307	0.177	0.435

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	33	0.532	11.9

GRAIN MEAN DM% 90.3

PLOT AREA HARVESTED 0.00176

95/R/WW/2

WINTER WHEAT

WATER STRESS AND WEED COMPETITION

Object: To study the competitive effects of weeds in winter wheat, with and without irrigation - Stackyard.

Sponsors: J.W. Cussans, P.J.W. Lutman.

Design: 4 randomised blocks of 2 plots split into 4 sub-plots.

Whole plot dimensions: 8.0 x 30.0.

Sub-plot dimensions: 4.0 x 15.0.

Treatments:

1. **IRRIGATN** Irrigation:
 - I Irrigated
 - 0 None

2. **WEED** Weed species:
 - None
 - SM *Stellaria media* (chickweed)
 - AM *Alopecurus myosuroides* (black-grass)
 - GA *Galium aparine* (cleavers)

Experimental diary:

- 02-Sep-94 : B : PK as (0:20:32) at 1317 kg.
- 07-Sep-94 : B : Ploughed and furrow pressed.
- 30-Sep-94 : B : Rotary harrowed.
- 04-Oct-94 : B : Spring-tine cultivated.
- 05-Oct-94 : B : Rotary harrowed.
 - : T : **WEED** SM, AM: Seed broadcast at 320 seeds per m².
 - : T : **WEED** GA: Seed broadcast at 24 seeds per m².
 - : B : Rotary harrowed, Mercia, dressed Cerevax, drilled at 380 seeds per m².
- 21-Nov-94 : B : Draza at 5.5 kg.
- 13-Jan-95 : T : **WEED** SM, GA: Cheetah R at 2.5 l in 220 l.
 - : T : **WEED** AM: Starane 2 at 0.75 l with Oxytril CM at 1.5 l in 220 l.
 - : T : **WEED** -: Stefes IPU at 3.0 l with Stomp 400 at 3.3 l in 220 l.
- 14-Mar-95 : B : 34.5% N at 118 kg.
- 21-Mar-95 : T : **WEED** GA: Isoproturon 500 at 3.0 l in 220 l.
 - : T : **WEED** -: Ally at 30 g with Starane 2 at 0.75 l and Topik at 125 ml in 220 l.
- 19-Apr-95 : B : 34.5% N at 463 kg.
- 28-Apr-95 : T : **IRRIGATN** I: Irrigated 25 mm.
- 05-May-95 : B : Calixin at 0.35 l with Halo at 2.0 l in 200 l.
- 15-May-95 : T : **IRRIGATN** I: Irrigated 25 mm.
- 02-Jun-95 : T : **IRRIGATN** I: Irrigated 25 mm.
- 20-Jun-95 : B : Silvacur at 1.0 l in 200 l.

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Experimental diary:

20-Jun-95 : T : IRRIGATN I: Irrigated 15 mm.
 21-Jun-95 : T : IRRIGATN I: Irrigated 20 mm.
 29-Jun-95 : T : IRRIGATN I: Irrigated 25 mm.
 06-Jul-95 : T : IRRIGATN I: Irrigated 25 mm.
 13-Jul-95 : T : IRRIGATN I: Irrigated 25 mm.
 20-Jul-95 : T : IRRIGATN I: Irrigated 25 mm.
 05-Aug-95 : B : Roundup at 4.0 l in 200 l.
 14-Aug-95 : B : Hand harvested.

Previous crops: S. rape 1993, w. oats 1994.

NOTE: Weed density was assessed in autumn and spring. Weeds and crop were sampled regularly and dry weight, green area, height and nutrient content were measured. Tillers and leaves were also counted in the crop. Soil was sampled for nitrogen content in February. Flag leaf area and nutrient content were assessed in June. Black-grass seed produced was measured in June. Components of yield were assessed after harvest.

GRAIN TONNES/HECTARE

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

WEED	-	SM	AM	GA	Mean
IRRIGATN					
I	7.18	5.58	2.71	4.08	4.89
0	8.12	6.60	3.49	6.68	6.22
Mean	7.65	6.09	3.10	5.38	5.55

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

IRRIGATN	WEED	IRRIGATN WEED
0.433	0.255	0.534

Except when comparing means with the same level(s) of
IRRIGATN 0.361

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP.SP	18	0.511	9.2

GRAIN MEAN DM% 91.0

SUB-PLOT AREA HARVESTED 0.00020

95/W/WW/2

WINTER WHEAT

PREDICTION OF WEED COMPETITION

Object: To predict the yield response of winter wheat in competition with three contrasting weed species - Woburn, Lansome III.

Sponsors: P.J.W. Lutman, J.W. Cussans.

Design: 3 blocks of 3 x 6 plots. Treatments balanced for blocks in two directions

Plot dimensions: 3.0 x 8.0.

Treatments: All combinations of:-

1. **WEED SP** Weed species:
- | | |
|----|---------------------------------------------|
| SM | <i>Stellaria media</i> (chickweed) |
| AM | <i>Alopecurus myosuroides</i> (black-grass) |
| GA | <i>Galium aparine</i> (cleavers) |
2. **WEED DEN** Average weed densities, plants per m²:
- | | SM | AM | GA |
|--|------|-----|----|
| | 0 | 0 | 0 |
| | 103 | 78 | 2 |
| | 201 | 122 | 3 |
| | 348 | 223 | 8 |
| | 606 | 389 | 20 |
| | 1091 | 921 | 31 |

NOTE: Target weed densities were: SM and AM: 0, 40, 80, 160, 320, 640 and GA: 0, 3, 6, 12, 24, and 48 respectively.

Experimental diary:

- 21-Sep-94 : B : Ploughed.
28-Sep-94 : B : Rotary harrowed.
29-Sep-94 : T : Weed seeds sown by hand.
30-Sep-94 : B : Mercia, dressed Rappor, drilled at 330 seeds per m².
14-Mar-95 : T : **WEED DEN** 0: Ally at 30 g with Cheetah Super at 2.5 l in 220 l.
 : T : **WEED SP** AM: Ally at 30 g in 220 l.
 : T : **WEED SP** GA: Stefes IPU at 4.2 l in 220 l.
15-Mar-95 : B : 34.5% N at 116 kg.
21-Apr-95 : B : 34.5% N at 464 kg.
02-May-95 : B : Halo at 2.0 l in 200 l.
02-Jun-95 : B : Cyclone at 1.0 l with Mallard 750 EC at 0.5 l in 300 l.
29-Jun-95 : B : Pirimicarb 50 DG at 280 g in 300 l.
04-Aug-95 : B : Hand harvested.

95/W/WW/2

NOTE: Weeds were counted in autumn and spring. Weeds and crop were sampled in winter and monthly from March to harvest for dry weight, green area and height, crop also had tillers and leaves per plant counted. Soil was sampled for nitrogen content in February. Flag leaf area and nutrient content were assessed in June. Black-grass seed produced was measured in June. Components of yield were assessed after harvest.

GRAIN TONNES/HECTARE

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

WEED DEN	0	2	4	8	16	32	Mean
WEED SP							
SM	5.31	3.42	2.66	2.49	3.34	3.13	3.39
AM	4.22	5.24	4.52	4.51	3.35	3.06	4.15
GA	5.07	4.39	4.89	4.72	5.15	4.41	4.77
Mean	4.87	4.35	4.02	3.91	3.95	3.53	4.11

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

WEED SP	WEED DEN	WEED SP WEED DEN
0.243	0.344	0.595

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	32	0.729	17.8

GRAIN MEAN DM% 85.2

PLOT AREA HARVESTED 0.00020

95/R/WW/10

WINTER WHEAT

PLANT N INDICATORS

Object: To relate chlorophyll concentrations in individual leaves of w. wheat to nitrogen supply and crop yield - Little Hoos.

Sponsor: P.B. Barraclough.

Design: 4 randomised blocks of 11 plots.

Plot dimensions: 3.0 x 20.0.

Treatments:

N	Timing, rate and form of nitrogen fertilizer in spring (kg N):			
	G.S. 30	G.S. 31	G.S. 37	TOTAL
1	40	60	0	100
2	40	60	20	120
3	40	60	40	140
4	40	60	60	160
5	40	60	40*	140
6	40	60	80	180
7	40	60	-	160**
8	40	100	0	140
9	40	100	40	180
10	40	140	0	180
11	40	210	0	250

NOTES: * Treatment 5, nitrogen at G.S. (Growth Stage) 37 was applied as foliar urea (46% N).

** Treatment 7 received an extra 30 kg of N in early May, repeated in late May.

Experimental diary:

06-Sep-94 : B : PK as (0:20:32) at 1317 kg.

08-Sep-94 : B : Deep tine cultivated with vibrating tines 60 cm apart and 45 cm deep.

29-Sep-94 : B : Rolled. MSS Optica at 2.4 l in 200 l.

07-Oct-94 : B : Ploughed and furrow pressed.

21-Oct-94 : B : Spring-tine cultivated.

: B : Rotary harrowed, Mercia, dressed Rappor, drilled at 380 seeds per m².

24-Nov-94 : B : Alpha Isoproturon 500 at 3.0 l with Stomp 400 at 3.3 l in 200 l.

10-Mar-95 : B : 34.5% N at 118 kg.

07-Apr-95 : B : Tiger 90 at 35 kg.

20-Apr-95 : T : N 1, 2, 3, 4, 5, 6, 7: 34.5% N at 174 kg.

: T : N 8, 9: 34.5% N at 290 kg.

: T : N 10: 34.5% N at 405 kg.

: T : N 11: 34.5% N at 609 kg.

10-May-95 : B : Halo at 2.0 l in 200 l.

95/R/WW/10

Experimental diary:

11-May-95 : T : N 7: 34.5% N at 87 kg.
15-May-95 : T : N 2: 34.5% N at 58 kg.
 : T : N 3 and 9: 34.5% N at 116 kg.
 : T : N 4: 34.5% N at 174 kg.
 : T : N 5: 46% N (foliar) at 87 kg.
 : T : N 6: 34.5% N at 232 kg.
24-May-95 : T : N 7: 34.5% N at 87 kg.
20-Jun-95 : B : Silvacur at 1.0 l in 200 l.
03-Aug-95 : B : Combine harvested.

Previous crops: Potatoes 1993, s. beans 1994.

- NOTES:** (1) Tiger 90 is a sulphur fertilizer (90% S).
(2) The yield of one plot of treatment 8, was lost during harvesting. An estimated value was used in the analysis.
(3) Leaf chlorophyll was measured with a SPAD metre on 8 occasions between GS 24 and GS 77.

GRAIN TONNES/HECTARE

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

N	
1	8.62
2	9.22
3	9.43
4	9.47
5	9.43
6	9.48
7	9.53
8	9.86
9	9.71
10	10.10
11	9.61
Mean	9.50

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

N
0.391

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

Stratum	d.f.	s.e.	cv%
BLOCK.WP	29	0.553	5.8
GRAIN MEAN DM%	91.2		
PLOT AREA HARVESTED	0.00345		

95/R/BW/2

WINTER BARLEY

RHYNCHOSPORIUM STUDY

Object: To characterise two geographically separated *Rhynchosporium* populations and to assess their susceptibility to fungicides. The experiment was repeated at Long Ashton Research Station, Bristol - Osier.

Sponsor: D.W. Holloman, Long Ashton Research Station.

Design: 2 randomised blocks of 4 plots.

Whole plot dimensions: 20.0 x 24.0.

Treatments:

FUNGICIDE	Fungicide:
-	None
CARB	Carbendazim
CARB+PRO	Carbendazim and propiconazole
PRO+TRI	Propiconazole and tridemorph

Experimental diary:

26-Jul-94 : B : Straw baled and removed.
05-Sep-94 : B : PK as (0:20:32) at 1317 kg.
09-Sep-94 : B : Ploughed and furrow pressed.
02-Nov-94 : B : Rotary harrowed, Chariot, dressed Rappor and Gamma-HCH, drilled at 350 seeds per m².
21-Mar-95 : B : 34.5% N at 118 kg.
03-Apr-95 : T : **FUNGICIDE** CARB: Carbate Flowable at 0.5 l in 200 l.
 : T : **FUNGICIDE** CARB+PRO: Hispor 45 WP at 0.5 l in 200 l.
 : T : **FUNGICIDE** PRO+TRI: Tilt Turbo 475 EC at 1.0 l in 200 l.
12-Apr-95 : B : 34.5% N at 300 kg.
21-Apr-95 : B : Ally at 30 g with Starane 2 at 0.75 l in 200 l.
28-Apr-95 : B : Terpal at 1.5 l with Vassgro Spreader at 300 ml in 300 l.
21-Jul-95 : B : Combine harvested.

Previous crops: Set-aside 1993, w. barley 1994.

95/R/BW/2

GRAIN TONNES/HECTARE

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

FUNGCIDE	
-	5.64
CARB	5.46
CARB+PRO	6.23
PRO+TRI	6.30
Mean	5.91

GRAIN MEAN DM% 87.9

PLOT AREA HARVESTED 0.00460