ROTHAMSTED RESEARCH

Yields of the Field Experiments 1974

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Annuals - Wheat

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74/R/WW/1 and 74/W/WW/1

WINTER WHEAT

VARIETIES, N AND CCC

Object: To study the yields and flour quality of a selection of the newer varieties of wheat grown on land in rotation or after several cereals. Nitrogen rates and times, chlormequat (CCC) and a foliar fungicide are also tested - Rothamsted (RH) Little Hoos (pathogen free) and Rothamsted (RD) Gt. Harpenden I (pathogen infected) and Woburn (WH) Horsepool (pathogen free).

Sponsor: J.R. Moffatt.

Design: 4 randomised blocks of 8 plots, split into 4, with confounding.

Whole plot dimensions: 4.27 x 27.1. Sub plot area harvested: 0.00173.

Treatments: All combinations of:-

Whole plots: 1. Varieties:

	VARIETY
Atou	AT
Bouquet	BO
Cappelle	CA
Maris Freeman	FR
Maris Fundin	FU
Maris Huntsman	HU
Maris Nimrod	NI
Maris Templar	TE

Sub plots: 2. Nitrogen fertiliser (kg N): N

Little Hoos (RH)	Gt.Harpenden I (RD) and Horsepool (WH)	(RH)	(RD & WH)
None	63 in spring	0	63
63 in spring	126 in spring	63	126
126 in spring	189 in spring	126	189
63 in spring + 63 at flowering	126 in spring + 63 at flowering	63 + 63	126 + 63

3. Chlormequat (kg): CCC

None	0.0
1.7	1.7

4. Fungicide at ear emergence: FUNGCIDE

None	None
Carbendazim at 0.15 kg + tridemorph at 0.26 kg, + maneb at 1.59 kg, applied in 360 l	Ca/Tr/Ma

NOTE: The test of fungicide was made on Little Hoos (RH) only.

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Basal applications:- Manures:
Little Hoos (RH), and Great Harpenden I (RD): 310 kg (0:20:20) combined drilled.
Horsepool (WH) 290 kg (0:20:20) combine drilled.
Weedkillers:
Little Hoos (RH): Mecoprop at 1.3 kg in 225 l.
Great Harpenden I (RD): Paraquat at 0.84 kg ion in 440 l. MCPA, mecoprop and dicamba ('Banlene Plus' at 4.5 kg in 220 l).
Horsepool (WH): Mecoprop at 2.1 kg in 280 l.

Seed: Varieties, dressed with dieldrin, sown at Little Hoos (RH) and Great Harpenden I (RD) 200 kg. Horsepool (WH) 190 kg.

Cultivations, etc.:-
Little Hoos (RH): Deep-tine cultivated twice, rotary harrowed: 30-31 Oct, 1973. Seed sown: 1 Nov. N applied: 17 Apr, 1974. Weedkiller applied: 24 Apr. Chlormequat applied: 15 May. Fungicide applied (plots 41-64): 13 June. Late N applied: 14 June. Fungicide applied (plots 33-40): 19 June. Combine harvested: 17 Sept. Previous crops: Grass 1972, potatoes 1973.
Great Harpenden I (RD): Deep-tine cultivated twice: 13 Sept, 1973, 14 Sept. Paraquat applied: 18 Oct. Seed sown: 1 Nov. N applied: 18 Apr, 1974. Weedkiller applied: 30 Apr. Chlormequat applied: 15 May. Late N applied: 14 June. Combine harvested: 17 Sept. Previous crops: Barley 1972 and 1973.
Horsepool (WH): Deep-tine cultivated twice: 27 Oct, 1973, 29 Oct. Seed sown: 31 Oct. N applied: 19 Apr, 1974. Weedkiller applied: 20 Apr. Chlormequat applied: 17 May. Late N applied: 14 June. Combine harvested: 11 Sept. Previous crops: Beans 1972, potatoes 1973.

Standard errors of differences. Grain, tonnes/hectare:

Little Hoos (R).	Whole plot:	0.276 or 4.0% (19 d.f.)
	Sub plot:	0.766 or 11.2% (51 d.f.)
Gt. Harpenden I (R).	Whole plot:	0.305 or 4.7% (14 d.f.)
	Sub plot:	0.591 or 9.1% (48 d.f.)
Horsepool (W).	Whole plot:	0.435 or 6.6% (14 d.f.)
	Sub plot:	0.455 or 6.9% (48 f.f.)

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TABLES OF MEANS

LITTLE HOOS (RH): PATHOGEN FREE

GRAIN: TONNES/HECTARE

VARIETY

	AT	BO	CA	FR	FU	HU	NI	TE	Mean
N									
0	5.59	5.58	4.58	4.99	5.69	4.99	5.60	5.91	5.37
63	7.34	6.84	5.85	5.99	6.93	7.04	7.99	6.87	6.85
126	7.21	7.86	7.12	7.06	8.87	8.45	8.33	8.55	7.93
63+63	6.34	7.21	6.80	6.73	7.86	8.14	7.49	7.42	7.25
CCC									
0.0	5.82	6.52	5.68	5.88	7.48	6.49	6.94	6.77	6.45
1.7	7.42	7.22	6.49	6.50	7.19	7.81	7.77	7.61	7.25
FUNGCIDE									
None	6.96	6.87	6.12	5.97	7.38	6.99	7.61	6.81	6.84
Ca/Tr/Ma	6.28	6.88	6.05	6.41	7.30	7.32	7.09	7.57	6.86
Mean	6.62	6.87	6.09	6.19	7.34	7.15	7.35	7.19	6.85

STANDARD ERRORS OF DIFFERENCES

N	CCC	FUNGCIDE	VARIETY	N VARIETY	CCC VARIETY	FUNGCIDE VARIETY
0.192	0.135	0.135	0.195	0.508	0.334	0.334
Except when comparing means with same level of VARIETY				0.542	0.383	0.383

Mean D.M. % 77.4

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GT. HARPENDEN I (RD): PATHOGEN INFECTED

GRAIN: TONNES/HECTARE

VARIETY

	AT	BO	CA	FR	FU	HU	NI	TE	Mean
N									
63	5.22	5.40	5.27	5.04	4.20	5.93	6.01	6.12	5.40
126	6.30	6.43	6.68	6.35	5.21	7.61	7.53	7.62	6.72
189	6.87	6.58	6.52	7.24	5.94	7.87	7.69	7.78	7.06
126+63	6.38	7.02	6.84	6.80	6.08	7.31	6.95	7.32	6.84
CCC									
0.0	5.97	6.11	6.29	6.28	5.34	6.78	6.94	6.88	6.32
1.7	6.42	6.61	6.37	6.44	5.38	7.58	7.15	7.54	6.69
Mean	6.19	6.36	6.33	6.36	5.36	7.18	7.04	7.21	6.50

STANDARD ERRORS OF DIFFERENCES

N	CCC	VARIETY	N VARIETY	CCC VARIETY
0.148	0.104	0.216	0.421	0.300
Except when comparing means with same level of		VARIETY	0.418	0.296

Mean D.M. % 78.9

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HORSEPOOL WOBURN (WH): PATHOGEN FREE

GRAIN: TONNES/HECTARE

VARIETY

	AT	BO	CA	FR	FU	HU	NI	TE	Mean
N									
63	6.72	6.89	6.60	6.73	7.52	6.21	7.26	7.27	6.90
126	6.83	6.42	5.81	6.28	7.66	6.57	6.78	7.99	6.79
189	5.93	5.63	5.28	5.93	6.89	6.71	6.31	7.28	6.24
126+63	6.61	6.35	5.33	6.23	7.57	6.81	6.05	7.67	6.58
CCC									
0.0	6.04	6.00	5.34	5.91	7.53	6.14	6.27	7.37	6.33
1.7	7.00	6.64	6.18	6.67	7.29	7.01	6.93	7.74	6.93
Mean	6.52	6.32	5.76	6.29	7.41	6.58	6.60	7.55	6.63

STANDARD ERRORS OF DIFFERENCES

N	CCC	VARIETY	N VARIETY	CCC VARIETY
0.114	0.080	0.308	0.415	0.347
Except when comparing means with same level of VARIETY			0.322	0.228

Mean D.M. % 80.2

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74/R/WW/2

WINTER WHEAT

RATES OF MERCURY SEED DRESSINGS

Object: To study the effects of a range of rates of two organo-mercury seed dressings on incidence of Septoria nodorum and yield of winter wheat - Little Hoos.

Sponsor: G.L. Bateman.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 4.27 x 11.6. Area harvested: 0.00155.

Treatments: All combinations of:

1. Form of organo-mercury seed dressing — HG FORM

Ethyl mercuric chloride	EMC
Phenyl mercuric acetate	PMA

2. Rate of organo-mercury seed dressing (as mg Hg/kg of seed) — HG RATE

None	0.0
0.4	0.4
2.0	2.0
10.0	10.0
50.0	50.0

NOTE: 75% of the seed was infected with Septoria nodorum and 25% with Fusarium spp.

Basal applications: Manures: (0:20:20) at 310 kg, 'Nitro-Chalk' at 400 kg. Weedkiller: Mecoprop ('Compitox Extra' at 4.2 l in 220 l).

Seed: Joss Cambier sown at 210 kg.

Cultivations, etc.:- Deep-tine cultivated: 31 Oct, 1973. Rotary harrowed: 1 Nov. PK applied and spring-tine cultivated: 2 Nov. Seed sown: 6 Nov. N applied: 19 Apr, 1974. Weedkiller applied: 24 Apr. Combine harvested: 18 Sept. Previous crops: Ley 1972, potatoes 1973.

NOTE: Seedling emergence counts were made three times in January-February, 1974. Percentage infection of seedlings with S. nodorum and Fusarium spp. were made on 11 and 25 January, 1974. Ear, flag leaf and second leaf were scored for Septoria infection on 31 July. Samples of harvested seed were tested for S. nodorum and other pathogens.

Standard error per plot.
Grain, tonnes/hectare: 0.234 or 3.3% (19 d.f.)

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74/R/WW/2

TABLES OF MEANS

GRAIN: TONNES/HECTARE

HG RATE

	0.0	0.4	2.0	10.0	50.0	Mean
HG FORM						
EMC		7.32	7.08	7.57	5.27	6.81
PMA		7.64	7.34	7.62	6.89	7.37
Mean	7.47	7.48	7.21	7.59	6.08	7.17

STANDARD ERRORS OF DIFFERENCES

HG FORM	HG RATE	HG FORM HG RATE
0.096	0.135	0.191

Mean D.M. % 79.7

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74/R/WW/3

WINTER WHEAT

FUNGICIDES

Object: To study the effects of a range of fungicides on foliar and root diseases and yield of winter wheat - West Barnfield II.

Sponsors: R.D. Prew, J.F. Jenkyn.

Design: 2 randomised blocks of 14 plots.

Whole plot dimensions: 2.13 x 13.4, except NC5936/P: 6.40 x 13.4.
Area harvested: 0.00195.

Treatments: Fungicides, rates and methods of application:

Fungicide	Method of application (rates as kg a.i.)	FUNGCIDE
None (3 plots per block)	-	None
'BAS 3000F'	Foliar spray (0.75)	BAS/S
'BAS 3000F' + tridemorph	Foliar spray (0.5 + 0.25 respectively)	BAS+Tr/S
'Dowco 199'	Seed dressing (0.42) + foliar spray (0.5)	Dowco/DS
'Kitazin P'	Seed dressing (0.025) + foliar spray (0.5)	Kitaz/DS
'NC 5936'	Seed dressing (0.063)	NC5936/D
'NC 5936'	Pellets (4.0)	NC5936/P
Organo-mercury	Seed dressing (standard commercial)	OM/D
'PP 395'	Seed dressing (0.28) + foliar spray (0.1)	PP395/DS
'R 28921'	Seed dressing (0.56) + foliar spray (1.0)	28921/DS
'Terrazole'	Seed dressing (0.21)	Terraz/D
Tridemorph	Foliar spray (0.75)	Tridem/S

NOTES: (1) NC5936/P was formulated as 4% a.i. in naphthalene pellets.
(2) Both sprays and pellets were applied on 15 May and 19 June, 1974.

Basal applications: Manures: (10:24:24) at 250 kg combine drilled. 'Nitro-Chalk' at 500 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 370 l). Paraquat at 0.56 kg ion in 220 l.

Seed: Cana, sown at 200 kg.

Cultivations, etc.:- Paraquat applied: 4 Oct, 1973. Ploughed: 10 Oct. Spring-tine cultivated: 29 Oct and again 30 Oct. Seed sown: 31 Oct. N applied: 16 Apr, 1974. Weedkiller applied: 7 May. Combine harvested: 18 Sept. Previous crops: Barley and winter wheat 1972, barley 1973.

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74/R/WW/3

NOTES: (1) Samples were taken for assessment of foliar diseases on three occasions and twice for root diseases.
(2) Germination was adversely affected by 'NC 5936' seed dressing.

Standard error per plot.
Grain, tonnes/hectare: 0.571 or 8.4% (15 d.f.)

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74/R/WW/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGCIDE	
None	6.73
BAS/S	7.01
BAS+Tr/S	7.06
Dowco/DS	6.56
Kitaz/DS	6.92
NC5936/D	6.40
NC5936/F	6.89
OM/D	6.88
PP395/DS	7.00
28921/DS	7.50
Terraz/D	6.49
Tridem/S	6.69
Mean	6.83

STANDARD ERRORS OF DIFFERENCES	FUNGCIDE
None v any of remainder	0.466
Between any of remainder	0.571

Mean D.M. % 81.0

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74/R/WW/4

WINTER WHEAT

SEED DRESSING RATES AND BULB FLY

Object: To study the effects of a range of rates of two insecticidal seed dressings on attack by wheat bulb fly (Leptohylemyia coarctata) and yield of winter wheat - Great Harpenden I.

Sponsor: D.C. Griffiths.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 2.41 x 9.14. Area harvested: 0.0015l.

Treatments: All combinations of:-

1. Insecticidal seed dressings:	INSCTCDE
Dieldrin	Dieldrin
Chlorfenvinphos	Chlorfen
2. Amounts of seed dressing (g/kg of seed):	**AMT G KG**
None	0.00
0.25	0.25
0.50	0.50
1.00	1.00
2.00	2.00
4.00	4.00

Basal applications: Manures: (0:20:20) at 380 kg, 'Nitro-Chalk' at 380 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 340 l).

Seed: Cappelle, sown at 190 kg.

Cultivations, etc.:- Spring-tine cultivated and seed sown: 31 Oct, 1973. N applied: 24 Apr, 1974. Weedkiller applied: 8 May. Combine harvested: 30 Sept. Previous crops: Potatoes 1972, fallow 1973.

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NOTES: (1) Plant density was assessed on 14 Dec, 1973 before insect attack and again on 6 May, 1974. Plant samples were taken on 27 Mar for counts of wheat bulb fly larvae.

Standard error per plot.
Grain, tonnes/hectare: 0.221 or 3.0% (34 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

AMT G KG

	0.00	0.25	0.50	1.00	2.00	4.00	Mean
INSCTCDE							
Dieldrin		7.38	7.44	7.50	7.38	7.55	7.45
Chlorfen		7.36	7.38	7.48	7.42	7.40	7.41
Mean	7.41	7.37	7.41	7.49	7.40	7.47	7.43

STANDARD ERRORS OF DIFFERENCES

INSCTCDE	AMT G KG	INSCTCDE AMT G KG
0.070	0.110	0.156

Mean D.M. % 82.9

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74/R/WS/1

SPRING WHEAT

N LEVELS AND PHYSIOLOGY

Object: To study the physiological basis of the response of spring wheat to a wide range of nitrogen levels - Long Hoos IV.

Sponsor: G.N. Thorne.

Design: 2 blocks of 18 plots.

Whole plot dimensions: 2.41 x 12.2. Area harvested: 0.00075.

Treatments: All combinations of:-

1. Nitrogen fertiliser (kg N):

	N RATE
None	0
25	25
50	50
75	75
100	100
125	125
150	150
175	175
200	200

2. Time and form of nitrogen fertiliser:

	N TIME
All in 'seedbed' as 'Nitro-Chalk'	Single
Half in 'seedbed' as 'Nitro-Chalk', half after anthesis as foliar spray of urea in 340 l	Divided

NOTE: 'Seedbed' N was applied on 25 Apr, 1974, 4 weeks after seed sown and foliar spray on 5 July.

Basal applications: Manures: (0:14:28) at 1260 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 340 l). Fungicides: Ethirimol ('Milgo' at 1.4 l in 340 l) on 2 occasions, benomyl ('Benlate' at 2.2 kg in 340 l) and benodanil (BASF 3170F at 2.2 kg in 340 l).

Seed: Kleiber, dressed with benomyl, sown at 190 kg.

Cultivations, etc.:- PK applied: 19 Nov, 1973. Ploughed: 26 Nov. Power harrowed, seed sown: 27 Mar, 1974. Weedkiller applied: 20 May. Ethirimol applied on: 25 May and 8 July, benomyl on: 21 June and benodanil on: 17 July. Combine harvested: 10 Sept. Previous crops: Wheat 1972, fallow 1973.

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NOTE: Plant counts were made after germination and shoot counts throughout the season. Plant samples were taken on six occasions for growth analysis. Rates of photosynthesis and respiration were measured after anthesis. Soil moisture was measured on four occasions. Light penetration into the leaf canopy was measured twice. Dates of anthesis and of yellowness at ripening were also determined.

Standard error per plot.
Grain, tonnes/hectare: 0.286 or 5.4% (18 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

N RATE

	0	25	50	75	100	125	150	175	200	Mean
N TIME										
Single		5.23	5.19	5.13	5.67	5.39	5.46	5.51	5.69	5.41
Divided		5.30	5.62	5.28	5.28	5.12	5.06	4.92	5.34	5.24
Mean	5.16	5.26	5.41	5.21	5.47	5.25	5.26	5.21	5.51	5.31

STANDARD ERRORS OF DIFFERENCES

N TIME	N RATE	N TIME N RATE
0.101	0.202	0.286

Mean D.M. % 78.6

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