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Spring Barley

Rothamsted Research

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73/R/BS/1 and 73/BE/BS/1

SPRING BARLEY

GROWTH AND YIELD ON CONTRASTED SITES

Object: To try to account for yields and differences between yields of barley on sites at Rothamsted and Broom's Barn by studying crop growth rates, nutrient uptake, water use etc., at a wide range of nitrogen levels, with and without irrigation. Also to study the interaction between site differences and crops (see also 73/R and BB/WW/2) - Rothamsted (R), Long Hoos I and II, and Broom's Barn (BB), Dunholme Field.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: 3 randomised blocks of 2 plots, split into 6.

Whole plot dimensions:

Long Hoos I and II (R): 15.2 x 48.0. Sub plot area harvested: 0.00434.
Dunholme Field (BB): 15.2 x 45.7. Sub plot area harvested: 0.00413.

Treatments: All combinations of:-

Whole plots: 1. Irrigation:

	IRRIGN
None	0
Full irrigation	I

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

	N
31	31
63	63
94	94
125	125
157	157
188	188

Total irrigation was 50.8 mm applied on 2 occasions (R) and 111.8 mm applied on 4 occasions (BB).

Basal applications:

Long Hoos (R): Manures: (0:20:20) at 360 kg combine drilled.

Weedkiller: MCPA, mecoprop and dicamba ('Tetralox Plus' at 7.0 l in 220 l). Fungicide: Tridemorph at 0.53 kg in 220 l.

NOTE: The site had a basal dressing of (0:20:20) at 1300 kg and Epsom salts at 900 kg in autumn 1971.

Dunholme Field (BB): Manures: (0:20:20) at 1300 kg. Epsom salts at 900 kg in autumn. (0:20:20) at 380 kg combine drilled. Weedkiller: MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 220 l). Fungicide: Tridemorph 0.53 kg in 220 l.

Seed: Julia, dressed with ethirimol, sown at 160 kg (R) and 180 kg (BB).

73/R/BS/1 and 73/BB/BS/1

Cultivations, etc.:-

Long Hoos (R): Ploughed: 9 Nov, 1972. N applied, springtine cultivated and seed sown: 9 Mar, 1973. Weedkiller and fungicide applied: 11 May. Irrigated: 14 and 18 June. Combine harvested: 10 Aug. Previous crops: Beans 1971, winter wheat 1972.

Dunholme Field (BB): Basal PK and Epson salts applied: 6 Oct, 1972. Ploughed: 10 Nov. N applied: 8 Mar, 1973. Seed sown: 12 Mar. Weedkiller and fungicide applied: 14 May. Irrigated: 8, 14, 15 June and 5 July. Combine harvested: 9 Aug. Previous crops: Sugar beet 1971, winter wheat 1972.

NOTE: Crop samples were taken throughout the season. The percentage of N, P and K was measured in all samples. The number of tillers or ear-bearing stems was counted, and the leaf areas measured at each sampling. Mildew (*Erysiphe graminis*) assessments were made. 1000 grain weights were determined. Soil moisture content was estimated by neutron probe weekly.

Standard errors per sub plot.	Grain: tonnes/hectare.
Long Hoos I and II (R):	0.318 or 5.7% (20 d.f.)
Dunholme Field (BB):	0.221 or 3.9% (20 d.f.)

73/R/BS/1 and 73/BB/BS/1

TABLES OF MEANS

LONG HOOS I AND II (R)

GRAIN: TONNES/HECTARE

	N						Mean
	31	63	94	125	157	188	
IRRIGN							
O	4.39	5.28	5.96	6.06	6.11	5.97	5.63
I	4.51	5.44	5.92	5.76	5.93	6.07	5.61
Mean	4.45	5.36	5.94	5.91	6.02	6.02	5.62

STANDARD ERRORS OF DIFFERENCES

	N	IRRIGN*
	N	
	0.184	
* Within the same level of IRRIGN only		0.260
Mean D.M. %	84.8	

STRAW: TONNES/HECTARE

IRRIGN							
O	1.94	2.97	4.25	4.77	5.05	5.10	4.01
I	2.65	3.28	4.15	5.15	4.94	5.28	4.24
Mean	2.30	3.12	4.20	4.96	5.00	5.19	4.13

Mean D.M. % 95.1

73/R/BS/1 and 73/BB/BS/1

DUNHOLME FIELD (BB)

GRAIN: TONNES/HECTARE

	N						Mean
	31	63	94	125	157	188	
IRRIGN							
O	5.89	6.01	5.24	5.20	5.43	5.39	5.52
I	5.86	6.10	5.79	5.81	5.77	5.97	5.88
Mean	5.87	6.05	5.51	5.50	5.60	5.68	5.70

STANDARD ERRORS OF DIFFERENCES

	N	IRRIGN*
		N
	0.128	
* Within the same level of IRRIGN only		0.185

Mean D.M. % 81.4

STRAW: TONNES/HECTARE

IRRIGN							
O	4.39	4.61	4.99	4.92	4.79	4.73	4.74
I	4.71	6.02	6.18	5.76	6.06	5.73	5.74
Mean	4.55	5.32	5.59	5.34	5.43	5.23	5.24

Mean D.M. % 64.4

TS/R/16/2 AND TS/N/29/2

SPRING BARLEY

VARIETIES AND N

Object: To study the yield of newer varieties of barley grown at a range of nitrogen levels - Rothamsted (R) Gt Harpenden II and Woburn (W) Horsepool Lane Close.

Sponsors: J.R. Moffatt, J.F. Jenkyn.

Design: 4 blocks of 11 plots, split into 3.

Whole plot dimensions: 4.27 x 24.7. Sub plot area harvested:
Gt Harpenden II (R): 0.00163. Horsepool Lane Close (W): 0.00217.

Treatments: All combinations of:-

Whole plots: 1. Varieties and Mildew control	VARIETY
Berac, sprayed tridemorph	BE-T
Gertra, sprayed tridemorph	GE-T
Hassan, sprayed tridemorph	HA-T
Julia, no mildew control	JU-C
Julia, seed dressed ethirimol	JU-E
Julia, sprayed tridemorph	JU-T
Lofa Abed, sprayed tridemorph	LA-T
Mazurka, sprayed tridemorph	MA-T
Maris Mink, sprayed tridemorph	MM-T
Universe, sprayed tridemorph	UN-T
Vada, sprayed tridemorph	VA-T

Tridemorph applied at 0.53 kg in 370 l.

Sub plots: 2. Nitrogen fertiliser (kg N)	N
38	38
75	75
113	113

Basal applications:

Gt Harpenden II (R): Manures: 310 kg (0:20:20) combine drilled.
Weedkiller: MCPA, mecoprop and dicamba ('Tetralix plus' at 7.0 l in 220 l).

Horsepool Lane Close (W): Manures: Magnesian limestone at 7.5 tonnes, 310 kg (0:20:20) combine drilled: Weedkiller: Ioxynil at 0.53 kg and mecoprop at 1.6 kg in 280 l.

73/R/BS/2 AND 73/W/BS/2

Seed: Gt Harpenden II (R) and Horsepool Lane Close (W): Varieties sown at 160 kg.

Cultivations, etc.:-

Gt Harpenden II (R): Ploughed: 24 Nov, 1972. Seed sown: 16 Mar, 1973.
F applied: 23 Mar. Weedkiller applied: 15 May. Tridemorph applied: 1 June. Combine harvested: 11 Aug. Previous crops: Spring beans 1971, barley 1972.

Horsepool Lane Close (W): Deep-tine cultivated: 1 Sept, 1972. Magnesian limestone applied: 18 Sept. - Deep-tine cultivated: 26 Sept.
Ploughed: 1 Jan, 1973. Power harrowed seed sown: 14 Mar.
N applied: 19 Mar. Weedkiller applied: 11 May. Tridemorph applied: 1 June. Combine harvested: 10 Aug. Previous crops: Fallow 1971, barley 1972.

NOTE: Gt Harpenden II (R). Some of the grain was lost from one plot - treatment EE-T, N 38. An estimated value was used in the analysis.

Standard errors per plot. Grain: tonnes/hectare:

Gt Harpenden II (R):	Whole plot: 0.207 or 3.3% (30 d.f.)
	Sub plot: 0.221 or 3.6% (65 d.f.)
Horsepool (W):	Whole plot: 0.451 or 8.8% (30 d.f.)
	Sub plot: 0.638 or 12.5% (66 d.f.)

73/R/BS/2 AND 73/W/BS/2

TABLES OF MEANS

CRAIN: TOMES/HECTARE

GT HARPENDEN II (R)

VARIETY

	BE-T	GE-T	LA-T	JU-O	JU-E	JU-T	LA-T	MA-T	MI-T	UN-T	VA-T	Mean
N												
38	6.41	5.96	6.65	5.51	6.16	6.31	5.77	5.83	7.58	7.68	5.73	6.33
75	6.51	5.95	6.68	5.25	6.06	6.19	5.46	5.89	7.61	7.41	5.89	6.27
113	6.13	5.67	6.20	5.12	6.03	6.19	5.39	5.71	6.97	6.95	6.08	6.04
Mean	6.35	5.86	6.51	5.29	6.09	6.23	5.54	5.81	7.39	7.35	5.90	6.21

STANDARD ERRORS OF DIFFERENCES

N	VARIETY	N	VARIETY
0.047	0.147	0.194	

Except when comparing means
with same level of VARIETY: 0.156

Mean D.M. % 79.0

73/R/BS/2 AND 73/W/BS/2

GRAIN: TONNES/HECTARE

HORSEPOOL LANE CLOSE (W)

VARIETY

	BE-T	GE-T	HA-T	JU-O	JU-E	JU-F	LA-T	MA-T	MM-T	UN-T	VA-T	Mean
N												
36	4.73	5.03	5.20	4.36	4.79	5.19	4.59	4.94	5.27	3.74	4.82	4.79
75	5.09	5.00	5.00	4.49	5.22	5.33	5.28	5.21	5.12	5.30	5.29	5.12
113	5.35	5.52	5.30	4.71	5.48	5.79	5.14	5.67	5.33	5.85	5.42	5.41
Mean	5.06	5.18	5.16	4.52	5.16	5.44	5.00	5.27	5.24	4.96	5.17	5.11

STANDARD ERRORS OF DIFFERENCES

N	VARIETY	N	VARIETY
0.136	0.319	0.488	

Except when comparing means
with same level of VARIETY: 0.451

Mean D.M. % 83.0

73/R/BS/3

SPRING BARLEY

SYSTEMIC FUNGICIDE STUDY

Object: To study the effectiveness of different methyl benzimidazol-2-ylcarbamic acid (MBC) precursors and to relate chemical measurements of persistence, movement and conversion to MBC to field performance - Great Harpenden II.

Sponsors: I.J. Graham-Bryce, I.H. Williams.

Design: 6 randomised blocks of 4 plots.

Whole plot dimensions: 2.41 x 9.14. Area harvested: 0.00151.

Treatments: Fungicidal seed dressings:	FUNGICIDE
None	O
Benomyl	B
NF 48	N
Thiophanate methyl	T

All treatments applied at 0.9 kg/126 kg seed.

Basal applications: Manures: 440 kg (20:15:15) combine drilled. Weed-killer: MCPA, mecoprop and dicamba ('Tetrallex plus' at 7.0 l in 220 l).

Seed: Sultan (smut infected seed, not dressed apart from treatments) sown at 160 kg.

Cultivations, etc.: Deep-tine cultivated: 25 Aug, 1972. Ploughed: 24 Nov. Seed sown: 17 Mar, 1973. Weedkiller applied: 15 May. Combine harvested: 11 Aug. Previous crops: Beans 1971, barley 1972.

NOTE: Plant and soil samples were taken for residue analyses of the three fungicides. Counts of mildew were made three times and of smut once.

Standard error per plot.

Grain, tonnes/hectare: 0.262 or 4.9% (15 d.f.)

73/R/BS/3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGICIDE				
O	B	N	T	Mean
4.88	5.57	5.71	5.34	5.37

STANDARD ERROR OF DIFFERENCES

FUNGICIDE

0.152

Mean D.M. % 86.1

73/R/ES/5

SPRING FARLEY

DISTANCE AND MILDEW SPREAD

Object: To study the effects of fungicidal sprays, applied to barley at different times on yield and incidence of mildew. The effects of separating plots either by a mildew-infested or mildew-free crop are also studied - Whitlocks.

Sponsors: J.F. Jenkyn, A. Ewinbridge.

Design: Two 4 x 4 Latin squares one for each DISTANCE.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00195.

Treatments: All combinations of:-

1. Distance apart of plots:	DISTANCE
Close together (4.3 m)	Close
Far apart (22.9 m)	Far

2. Fungicidal sprays:	FUNGICIDE
None	0
Tridemorph spray when spore production began to increase rapidly (1 June)	T1
Tridemorph spray 10-14 days after T1 (11 June)	T2
Tridemorph spray 10-14 days after T2 (25 June)	T3

- NOTES:** (1) Tridemorph was applied at 0.53 kg in 290 l.
(2) Plots of 'Close' and 'Far' were sown with Zephyr, seed not dressed with ethirimol. Surrounds of 'Close' plots were sown with the same seed but surrounds of 'Far' plots were sown with Mazurka dressed with ethirimol.
(3) All 'Far' plots had adjacent plots sown with Mazurka, dressed with ethirimol, for covariance analysis.

Basal applications: Manures: 440 kg (20:15:15) combine drilled.
Weedkiller: MCPA, mecoprop and dicamba ('Tetralex Plus' 7.0 l in 220 l).

73/R/BS/5

Seed: Sown at 160 kg.

Cultivations, etc.:— Ploughed: 20 Nov, 1972. Seed sown: 19 Mar, 1973. Weedkiller applied: 16 May. Combine harvested: 14 Aug. Previous crops: Potatoes 1971, winter wheat 1972.

NOTE: Counts were made of seedling emergence and fertile tillers. Amounts of mildew and green leaf were assessed at approximately weekly intervals from end of May.

Standard errors per plot. Grain, tonnes/hectare.
Close DISTANCE: 0.163 or 3.4% (6 d.f.)
Far DISTANCE: 0.091 or 1.9% (6 d.f.)
Pooled within DISTANCES: 0.132 or 2.8% (12 d.f.)

73/R/BS/5

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGICIDE

	0	T1	T2	T3	Mean
DISTANCE					
Close	4.40	5.35	4.80	4.49	4.76
Far	4.41	5.29	4.86	4.47	4.76
Far-Close	+0.01	-0.06	+0.06	-0.02	0.00

STANDARD ERRORS OF DIFFERENCES

DISTANCE	FUNGICIDE DISTANCE	DISTANCE* DISTANCE
Close	Far	Far-Close
0.115	0.065	0.044

* For use only in the comparison of two differences.

Mean D.M. % 88.3

73/R/BS/6

SPRING BARLEY

TIMES OF APPLYING FUNGICIDES

Object: To study the effects of applying fungicides to barley, at a range of times on yield and incidence of mildew - Whittlocks.

Sponsor: J.F. Jenkyn.

Design: 4 blocks of 14 plots.

Whole plot dimensions: 4.27 x 12.2 Area harvested: 0.00260.

Treatments: Times of applying fungicides:	FUNGICIDE
None (2 plots per block)	O
Ethirimol seed dressing (2 plots per block)	ED
Ethirimol spray, early (1 June)	ES1
Ethirimol spray, late (25 June)	ES2
Tridemorph spray, early (2 plots per block) (1 June)	TS1
Tridemorph spray, late (25 June)	TS2
Tridemorph spray, 10-14 days after rapid increase in mildew spore production (11 June)	TS3
Captafol plus tridemorph sprays repeated 3 times (1,11,25 June)	CTS
Ethirimol seed dressing plus tridemorph spray, early (1 June)	EDTS1
Ethirimol seed dressing plus tridemorph spray, late (25 June)	EDTS2
Tridemorph spray, early plus late (1,25 June)	TS12

NOTE: Tridemorph was applied at 0.64 kg in 290 l
Ethirimol was applied at 0.44 kg in 290 l
Captafol was applied at 1.7 kg in 290 l.

Basal applications: Manures: (20:15:15) at 440 kg, combine drilled.
Weedkiller: MCPA, mecoprop and dicamba ('Tetralix plus' 7.0 l in 220 l).

Seed: Zephyr, sown at 160 kg.

Cultivations, etc.: - Ploughed: 20 Nov, 1972. Seed sown: 20 Mar, 1973.
Weedkiller applied: 18 May. Combine harvested: 14 Aug. Previous crops: Potatoes 1970, winter wheat 1971.

73/R/BS/6

NOTE: Counts were made of seedling emergence and fertile tillers.
Brown rust (*Puccinia hordei*) was assessed in mid July.
Mildew and % green leaf were assessed at intervals from May onwards.

Standard error per plot.

Grain, tonnes/hectare: 0.194 or 4.0% (42 d.f.)

TABLES OF MEANS

GRAIN: TONNES/HECTARE

FUNGICIDE											
O	ED	ES1	ES2	TSL	TS2	TS3	CTS	EDTSL	EDTS2	TSL2	Mean
4.34	4.88	4.91	4.45	5.23	4.50	4.83	5.55	5.25	4.92	5.21	4.89

STANDARD ERRORS OF DIFFERENCES

FUNGICIDE	
Between O, ED and TSL	0.097
Between remainder	0.138
Between any of O, ED, TSL and any of remainder	0.119

Mean D.M. % 87.9

73/R/BS/7

SPRING BARLEY

CONTROL OF CEREAL APHIDS AND BYDV

Object: To study the effects of controlling cereal aphids on the incidence of barley yellow dwarf virus (BYDV) and on yield of barley - Summerdells II.

Sponsor: R.T. Plumb.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 6.40 x 24.4. **Area harvested:** 0.00390.

Treatments: All combinations of:-

1. Phorate as granules to seedbed (kg a.i.)	PHDRATE
None	0.0
2.5	2.5
5.0	5.0
2. Menazon spray in early June (1 'Saphi-Col')	MENAZON (1)
None	0.0
0.7	0.7
3. Menazon spray in early July (1 'Saphi-Col')	MENAZON (2)
None	0.0
0.7	0.7

NOTE: Phorate was applied as 10% granules and menazon in 370 l.

Basal applications: Manures: 440 kg (20:15:15) combine drilled. **Weedkiller:** MCPA, mecoprop and dicamba ('Banlene Plus' 5.6 l in 220 l).

Seed: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:- Deep-tine cultivated twice: 1 Dec, 1972.

Phorate granules distributed and all plots spring-tine cultivated:

16 Mar, 1973. Seed sown: 17 Mar. Weedkiller applied: 15 May.

Menazon treatments applied: 8 June and 9 July. Combine harvested:

13 Aug. Previous crops: Barley 1971, beans 1972.

T3/R/BS/7

NOTE: Counts of plants with virus symptoms, of numbers and species of aphids and percentage parasitised were made at intervals throughout the season. 1000 grain weights were determined.

Standard error per plot.

Grain, tonnes/hectare: 0.175 or 2.8% (33 d.f.)

73/R/BS/7

3

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	MENZAON (1)		MENZAON (2)		Mean
	0.0	0.7	0.0	0.7	
PHORATE					
0.0	6.26	6.20	6.23	6.23	6.23
2.5	6.26	6.44	6.41	6.29	6.35
5.0	6.36	6.31	6.40	6.27	6.33
	MENZAON (1)				
	0.0		6.36	6.23	6.29
	0.7		6.34	6.30	6.32
Mean			6.35	6.26	6.30
MENZAON (1)		0.0		0.7	
MENZAON (2)	0.0	0.7	0.0	0.7	
PHORATE					
0.0	6.34	6.17	6.12	6.28	
2.5	6.30	6.23	6.51	6.36	
5.0	6.43	6.28	6.37	6.25	

STANDARD ERRORS OF DIFFERENCES

PHORATE	MENZAON (1)	MENZAON (2)	
0.062	0.050	0.050	
PHORATE	PHORATE	MENZAON (1)	PHORATE
MENZAON (1)	MENZAON (2)	MENZAON (2)	MENZAON (1)
			MENZAON (2)
0.087	0.087	0.071	0.124

Mean D.M. % 85.3

73/R/BS/8

SPRING BARLEY

EFFECT OF N AND PLOT LENGTH ON COMBINE PERFORMANCE

Object: To study the performance of the Claas 'Compact 20' and 'Sampo' combines in harvesting barley on different plot lengths at a range of nitrogen rates and to compare with hand harvesting - Long Hoos IV.

Sponsors: J.C. Wilson, R. Moffitt.

Design: 8 blocks of 6 plots split into 4.

Whole plot dimensions: Claas: 2.41 x 16.5
Sampo: 3.05 x 16.5

Treatments: All combinations of:

Whole plots:	1. Width of area harvested:	WIDTHCM
	165 cm as 13 rows, 12.7 cm (5 inches) apart, harvested by 'Claas Compact 20' combine on mechanically harvested sub plots	165Claas
	203 cm as 16 rows, 12.7 cm (5 inches) apart, harvested by 'Sampo' combine on mechanically harvested sub plots	203Sampo
	2. Nitrogen fertiliser (kg N):	N
	45	45
	90	90
	135	135
Sub plots:	3. Length of area harvested and method of harvest:	LENGTHM
	1.52m (5 feet) harvested by hand	1.52Hand
	1.52m (5 feet) harvested by machine	1.52Comb
	3.05m (10 feet) harvested by machine	3.05Comb
	6.10m (20 feet) harvested by machine	6.10Comb

NOTE: The 5 feet 16 row plots planned for hand harvesting were harvested by Sampo combine.

73/R/BS/8

Basal applications: Manures: Ground chalk at 7.5 tonnes. (0:14:28) at 390 kg. Weedkiller: MCPA, mecoprop and dicamba ('Tetralax plus' at 7.0 l in 290 l).

Seed: Julia, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.: - Ploughed: 26 Sept, 1972. PK applied and seed sown: 21 Mar, 1973. N applied: 25 Mar. Weedkiller applied: 18 May. Combine harvested: 13 Aug. Previous crops: Barley 1971, winter wheat 1972.

NOTE: The Claas combine cut 13 rows (at 5 in., about 13 cm) between single missing rows, the Sampo cut 16 rows between pairs of missing rows. Paths 2 feet (61 cm) wide were cut at all cross-boundaries. All yields have been adjusted for edge effects (Widdowson, F.V., *Experimental Husbandry*, 23, 16-20, 1973), the factors used were 0.69 (Claas) and 0.71 (Sampo).

Standard errors per plot (pooled whole and sub plot). Grain, tonnes/hectare:
WIDTHCM 165Claas only (LENGTHM 1.52Hand omitted): 0.379 or 6.7% (56 d.f.)
WIDTHCM 203Sampo only: 0.405 or 7.1% (60 d.f.)
Pooled (all treatments): 0.394 or 7.0% (16 d.f.)

73/R/88/8

TABLES OF MEANS

GRAIN: TONNES/HECTARE

	WIDTHCM 165C laas LENGTHM 1.52Hand Omitted						Mean	WIDTHCM 165C laas LENGTHM 1.52Hand
	45	N 90		135	LENGTHM 1.52 3.05 6.10 Comb Comb Comb			
WIDTHCM								
203Sampo	5.59	5.79	5.62	5.78	5.62	5.49	5.67	
165C laas	5.49	5.86	5.69	5.64	5.64	5.75	5.68	
		N						
		45		5.60	5.50	5.52	5.55	5.19
		90		5.86	5.79	5.78	5.82	5.33
		135		5.73	5.61	5.55	5.65	5.06
Mean				5.73	5.63	5.62	5.67	5.19

N LENGTHM	45			90			135		
	1.52 Comb	3.05 Comb	6.10 Comb	1.52 Comb	3.05 Comb	6.10 Comb	1.52 Comb	3.05 Comb	6.10 Comb
WIDTHCM									
203Sampo	5.69	5.54	5.44	5.85	5.78	5.68	5.79	5.55	5.35
165C laas	5.41	5.45	5.60	5.89	5.80	5.89	5.63	5.68	5.76

Grand mean 5.61
Mean D.M. $\frac{1}{2}$ 82.1

73/R/BS/8

STANDARD ERRORS OF DIFFERENCES

WIDTHCM 165Claas LENGTHM 1.52Hand omitted

WIDTHCM	N	LENGTHM	
0.061	0.075	1.52 Comb v 3.05 Comb	
		or 6.10 Comb	0.073
		3.05 Comb v 6.10 Comb	0.081

WIDTHCM N		WIDTHCM LENGTHM		N LENGTHM	
203Sampo	0.099	203Sampo 1.52Comb v any of remainder	0.099	1.52Comb	0.114
165Claas	0.114			3.05Comb or 6.10Comb	0.139
203Sampo v 165Claas	0.107	Between any of remainder	0.114	1.52Comb v 3.05 Comb or 6.10Comb	0.127

WIDTHCM
LENGTHM
N

Any 203Sampo 1.52Comb v remainder 0.171
Between any of remainder 0.197

WIDTHCM 165Claas LENGTHM 1.52Hand only
N

0.197

73/S/BS/1

SPRING BARLEY

VARIETIES, N AND FUNGICIDE

Object: To study the effects of a range of nitrogen levels, applied to seedbed or as a top dressing, on the yield of three barley varieties. The effects of a fungicide against brown rust are also studied - Saxmundham, Grove Plot.

Sponsors: F.V. Widdowson, A. Penny.

Design: 3 randomised blocks of 9 plots split into 2.

Whole plot dimensions: 2.43 x 12.2. Area harvested: 0.00045.

Treatments: All combinations of:-

Whole plots:	1. Varieties:	VARIETY
	Julia	Julia
	Mazurka	Mazurka
	Midas	Midas
	2. Nitrogen fertiliser (kg N):	NRATE
	50	50
	100	100
	150	150
	3. Time of applying nitrogen:	NTIME
	All to seedbed on 20 Mar	Seedbed
	Half to seedbed, half top dressed on 22 May	SB/TD
	All top dressed on 22 May	Topdress
Sub plots:	4. Fungicide spray against brown rust:	FUNGICIDE
	None	None
	BAS3170F applied at 1.4 kg a.i. in 340 l on 19 June repeated on 10 July	BAS3170F

Basal applications: Manures: (0:20:20) at 280 kg. Weedkiller: Dichlorprop and MCPA ('Mephetol plus' at 5.6 l in 340 l). Fungicide: Tridemorph ('Calixin' at 0.7 l) applied with the weedkiller.

73/S/BS/1

Seed: Dressed with ethirimol, sown at 190 kg.

Cultivations, etc.: - Ploughed: 27 Oct, 1972. PK applied, seed sown: 21 Mar, 1973. Weedkiller and fungicide applied: 22 May. Cut by hand: 15 Aug. Previous crops: Barley 1971, 1972.

NOTE: Brown rust (*Puccinia hordei*) and mildew (*Erysiphe graminis*) were assessed on 16 July.

Standard errors per plot. Grain, tonnes/hectare:

Whole plot: 0.248 or 4.9% (6 d.f.)

Sub plot: 0.274 or 5.5% (8 d.f.)

73/3/55/1

TABLES OF MEANS

GRAIN: TONS/3/HECTARE

VARIETY	NRADE			NTIME			FUNGICIDE		
	50	100	150	Seedbed	S/ID	Top dress	None	MS3170F	None
Julia	4.37	5.59	5.47	4.90	5.22	5.30	5.01	5.27	5.14
Mazurka	3.97	4.87	5.34	4.79	4.72	4.68	4.64	4.82	4.73
Midas	4.55	5.36	5.54	5.17	5.24	5.03	4.95	5.41	5.15
			NRADE						
		50		4.28	4.33	4.29	4.23	4.36	4.30
		100		5.22	5.46	5.13	5.06	5.49	5.27
		150		5.37	5.38	5.60	5.25	5.65	5.45
			NTIME						
				Seedbed			4.92	4.99	4.95
				S/ID			4.99	5.13	5.06
				Topdress			4.63	5.39	5.01
Mean							4.85	5.17	5.01

73/s/BS/1

TABLES OF MEANS

GRAIN: TONNES/HECTARE

STANDARD ERRORS OF DIFFERENCES

VARIETY	NRATE	NTIME	FUNGCIDE	VARIETY NRATE	VARIETY NTIME	NRATE NTIME
0.117	0.117	0.117	0.075	0.202	0.202	0.202
				VARIETY FUNGCIDE	NRATE FUNGCIDE	NTIME FUNGCIDE
				0.148	0.148	0.148
Except when comparing means with same level of				0.129	0.129	0.129
			VARIETY NRATE NTIME			

Mean D.M. % 87.8

