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Yields of the Field Experiments 1985

Full Table of Content

85/R/B/1 Factors Limiting Yield - W. Barley

Rothamsted Research

Rothamsted Research (1986) *85/R/B/1 Factors Limiting Yield - W. Barley ;* Yields Of The Field Experiments 1985, pp 224 - 235 **- DOI: https://doi.org/10.23637/ERADOC-1-19**

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85/R/B/1

WINTER BARLEY

FACTORS LIMITING YIELD

Object: To study the importance of factors that may limit the yield of early-sown winter barley - Long Hoos I/II.

Sponsors: F.V. Widdowson, R.J. Darby, R.J. Gutteridge, J.F. Jenkyn, B.R. Kerry, R.T. Plumb, G.J.S. Ross, G.C. Scott, D.W. Wood.

Design: Half replicate of (2 x 2 x 2 x 2 x 2 x 2) x 2 (E FUNG) arranged in 2 blocks of 32 plots + 10 extra plots in each block.

Whole plot dimensions: 3.0 x 15.2.

Treatments: Combinations of the following treatments, all variety Panda following a previous barley crop:-

1. SEEDRATE — Seed rate (seeds per square metre):

300
450

2. WINTER N — Rates of nitrogen fertilizer in winter (kg N) as prilled urea (46% N):

0	None
30+30	30 on 9 Nov, 1984, 30 on 4 Feb, 1985

3. SPRING N — Rates of nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk' (26% N) on 2 Apr:

120
180

4. E FUNG — Early fungicides:

NONE	None
TFSD	Triadimenol and fuberidazole seed dressing

5. L FUNG — Late fungicides:

NONE	None
SPRAYS	Prochloraz at 0.40 kg with carbendazim at 0.15 kg in 220 l on 10 Apr, 1985. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.38 kg in 220 l on 29 Apr. Captafol at 1.3 kg and triadimefon at 0.12 kg in 220 l on 20 May

6. GRTH REG — Growth regulator:

NONE	None
CHLORMEQ	Chlormequat applied at GS 13, 24, 30, at 0.52 kg in 340 l on 23 Oct, 1984, 26 Nov, and in 220 l on 10 Apr, 1985

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7. INSCTCDE — Insecticide:

NONE	None
CYPERMET	Cypermethrin at 0.02 kg in 220 l on 30 Oct, 1984

plus 8 extra treatments with variety Panda sown at 300 seeds per square metre and given cypermethrin, late fungicides, no chlormequat and all combinations of the following:

1. PRECROPX — Previous cropping:

OATS
FALLOW

2. N DIVX — Division of nitrogen fertilizer (kg N):

30+30+120	30 on 9 Nov, 1984, 30 on 4 Feb, 1985 (both as prilled urea) plus 120 as 'Nitro-Chalk' (26% N) on 2 Apr
180	180 as 'Nitro-Chalk' (26% N) on 2 Apr

3. E FUNGX — Early fungicides:

NONE	None
TFSD	Triadimenol and fuberidazole seed dressing

plus 8 extra treatments with variety Pirate sown at 300 seeds per square metre and given cypermethrin, late fungicides, no chlormequat and all combinations of the following:

1. PRECROPV — Previous cropping:

BARLEY
OATS

2. N DIVV — Division of nitrogen fertilizer (kg N):

30+30+120	30 on 9 Nov, 1984, 30 on 4 Feb, 1985 (both as prilled urea) plus 120 as 'Nitro-Chalk' (26% N) on 2 Apr
180	180 as 'Nitro-Chalk' (26% N) on 2 Apr

3. E FUNGV — Early fungicides:

NONE	None
TFSD	Triadimenol and fuberidazole seed dressing

plus 2 extra treatments following previous barley, with variety Panda and given no nitrogen fertilizer or chlormequat but given early fungicides, late fungicides and cypermethrin:

EXTRA NO	
SD 300	Seed sown at 300 seeds per square metre (duplicated)
SD 450	Seed sown at 450 seeds per square metre (duplicated)

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Basal applications: Manures: (0:18:36) at 280 kg. Weedkillers: Isoproturon at 2.4 kg with mecoprop at 1.1 kg, bromoxynil at 0.14 kg and ioxynil at 0.14 kg in 250 l. Mecoprop (as 'CMPP' at 3.6 l) with bromoxynil and ioxynil (as 'Deloxil' at 1.5 l) and isoproturon at 2.0 kg in 200 l. Growth regulator: Mepiquat chloride and 2-chloroethylphosphonic acid (as 'Terpal' at 2.0 l) with a wetting agent ('Agral' at 0.05 l) in 500 l.

Cultivations, etc.:- Cultivated by rotary digger: 1 Sept, 2 Sept, 1984. PK applied: 10 Sept. Ploughed, spring-tine cultivated: 11 Sept. Disced three times: 12 Sept. Rotary harrowed, seed sown: 13 Sept. Isoproturon, mecoprop, bromoxynil and ioxynil applied: 7 Dec. 'CMPP', 'Deloxil' and isoproturon applied: 15 Apr, 1985. Growth regulator applied: 3 May. Combine harvested: 15 Aug. Previous crops: W. barley 1983, w. barley, w. oats, fallow 1984.

NOTES: (1) Soil samples were taken in early October, November and February for amounts of nitrate and ammonium. Crop samples were taken from October to April for measurements of nitrate N concentration.
(2) Plants were counted in November and samples were taken in March, April and May to measure plant and shoot numbers, leaf areas, dry weights and nitrogen uptakes. After harvest thousand grain weights were measured.
(3) Leaf diseases, take-all, eyespot and barley yellow dwarf virus were assessed and aphids were counted.
(4) A cage was erected over the crop from late May to maturity to prevent damage by birds.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

WINTER N	0	30+30	MEAN
SEEDRATE			
300	6.48	6.87	6.67
450	6.21	6.75	6.48
MEAN	6.34	6.81	6.58

E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	6.53	6.82	6.67
450	6.34	6.62	6.48
MEAN	6.43	6.72	6.58

E FUNG	NONE	TFSD	MEAN
WINTER N			
0	6.04	6.64	6.34
30+30	6.82	6.80	6.81
MEAN	6.43	6.72	6.58

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	6.08	7.27	6.67
450	5.77	7.19	6.48
MEAN	5.92	7.23	6.58

L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	5.72	6.96	6.34
30+30	6.13	7.49	6.81
MEAN	5.92	7.23	6.58

L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	5.92	6.94	6.43
TFSD	5.92	7.52	6.72
MEAN	5.92	7.23	6.58

SPRING N	120	180	MEAN
SEEDRATE			
300	6.55	6.80	6.67
450	6.33	6.63	6.48
MEAN	6.44	6.71	6.58

SPRING N	120	180	MEAN
WINTER N			
0	6.26	6.43	6.34
30+30	6.62	7.00	6.81
MEAN	6.44	6.71	6.58

SPRING N	120	180	MEAN
E FUNG			
NONE	6.18	6.68	6.43
TFSD	6.69	6.75	6.72
MEAN	6.44	6.71	6.58

SPRING N	120	180	MEAN
L FUNG			
NONE	5.82	6.02	5.92
SPRAYS	7.05	7.41	7.23
MEAN	6.44	6.71	6.58

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE SEEDRATE	NONE	CYPERMET	MEAN
300	6.62	6.72	6.67
450	6.24	6.72	6.48
MEAN	6.43	6.72	6.58

INSCTCDE WINTER N	NONE	CYPERMET	MEAN
0	6.26	6.43	6.34
30+30	6.60	7.02	6.81
MEAN	6.43	6.72	6.58

INSCTCDE E FUNG	NONE	CYPERMET	MEAN
NONE	6.20	6.67	6.43
TFSD	6.67	6.77	6.72
MEAN	6.43	6.72	6.58

INSCTCDE L FUNG	NONE	CYPERMET	MEAN
NONE	5.81	6.04	5.92
SPRAYS	7.05	7.41	7.23
MEAN	6.43	6.72	6.58

INSCTCDE SPRING N	NONE	CYPERMET	MEAN
120	6.34	6.53	6.44
180	6.52	6.91	6.71
MEAN	6.43	6.72	6.58

GRTH REG SEEDRATE	NONE	CHLORMEQ	MEAN
300	6.59	6.75	6.67
450	6.47	6.49	6.48
MEAN	6.53	6.62	6.58

GRTH REG WINTER N	NONE	CHLORMEQ	MEAN
0	6.39	6.30	6.34
30+30	6.68	6.94	6.81
MEAN	6.53	6.62	6.58

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

GRTH REG E FUNG	NONE	CHLORMEQ	MEAN
NONE	6.37	6.49	6.43
TFSD	6.69	6.75	6.72
MEAN	6.53	6.62	6.58

GRTH REG L FUNG	NONE	CHLORMEQ	MEAN
NONE	5.85	5.99	5.92
SPRAYS	7.21	7.24	7.23
MEAN	6.53	6.62	6.58

GRTH REG SPRING N	NONE	CHLORMEQ	MEAN
120	6.49	6.39	6.44
180	6.58	6.85	6.71
MEAN	6.53	6.62	6.58

GRTH REG INSCTCDE	NONE	CHLORMEQ	MEAN
NONE	6.41	6.45	6.43
CYPERMET	6.65	6.79	6.72
MEAN	6.53	6.62	6.58

N DIVX PRECROPX	30+30+120	180	MEAN
OATS	8.85	8.36	8.61
FALLOW	7.65	8.67	8.16
MEAN	8.25	8.51	8.38

E FUNGX PRECROPX	NONE	TFSD	MEAN
OATS	8.36	8.85	8.61
FALLOW	8.29	8.03	8.16
MEAN	8.32	8.44	8.38

E FUNGX N DIVX	NONE	TFSD	MEAN
30+30+120	8.33	8.17	8.25
180	8.32	8.71	8.51
MEAN	8.32	8.44	8.38

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PRECROPX	E FUNGX N DIVX	NONE	TFSD
OATS	30+30+120	8.66	9.04
	180	8.05	8.67
FALLOW	30+30+120	7.99	7.31
	180	8.59	8.74

N DIVV PRECROPV	30+30+120	180	MEAN
BARLEY	8.39	6.79	7.59
OATS	9.10	9.06	9.08
MEAN	8.74	7.93	8.34

E FUNGV PRECROPV	NONE	TFSD	MEAN
BARLEY	6.63	8.56	7.59
OATS	8.70	9.45	9.08
MEAN	7.66	9.01	8.34

E FUNGV N DIVV	NONE	TFSD	MEAN
30+30+120	8.03	9.46	8.74
180	7.30	8.55	7.93
MEAN	7.66	9.01	8.34

PRECROPV	E FUNGV N DIVV	NONE	TFSD
BARLEY	30+30+120	7.29	9.50
	180	5.97	7.62
OATS	30+30+120	8.77	9.42
	180	8.63	9.48

EXTRA NO	SD 300	SD 450	MEAN
	4.00	3.98	3.99

GRAND MEAN 6.79

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

(NOT INCLUDING EXTRA PLOTS)
MARGIN OF TWO FACTOR TABLES 0.144
TWO FACTOR TABLES 0.203

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.575	8.7

GRAIN MEAN DM% 81.9

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

WINTER N	0	30+30	MEAN
SEEDRATE			
300	2.84	3.19	3.02
450	2.70	3.17	2.94
MEAN	2.77	3.18	2.98

E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	3.05	2.98	3.02
450	2.99	2.88	2.94
MEAN	3.02	2.93	2.98

E FUNG	NONE	TFSD	MEAN
WINTER N			
0	2.72	2.83	2.77
30+30	3.33	3.03	3.18
MEAN	3.02	2.93	2.98

L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	2.68	3.35	3.02
450	2.63	3.24	2.94
MEAN	2.66	3.30	2.98

L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	2.48	3.07	2.77
30+30	2.83	3.52	3.18
MEAN	2.66	3.30	2.98

L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	2.82	3.23	3.02
TFSD	2.50	3.36	2.93
MEAN	2.66	3.30	2.98

SPRING N	120	180	MEAN
SEEDRATE			
300	2.99	3.05	3.02
450	2.84	3.03	2.94
MEAN	2.91	3.04	2.98

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

SPRING N WINTER N	120	180	MEAN
0	2.79	2.76	2.77
30+30	3.04	3.31	3.18
MEAN	2.91	3.04	2.98

SPRING N E FUNG	120	180	MEAN
NONE	2.90	3.14	3.02
TFSD	2.93	2.93	2.93
MEAN	2.91	3.04	2.98

SPRING N L FUNG	120	180	MEAN
NONE	2.73	2.58	2.66
SPRAYS	3.10	3.49	3.30
MEAN	2.91	3.04	2.98

INSCTCDE SEEDRATE	NONE	CYPERMET	MEAN
300	2.97	3.06	3.02
450	2.78	3.09	2.94
MEAN	2.87	3.08	2.98

INSCTCDE WINTER N	NONE	CYPERMET	MEAN
0	2.73	2.81	2.77
30+30	3.02	3.34	3.18
MEAN	2.87	3.08	2.98

INSCTCDE E FUNG	NONE	CYPERMET	MEAN
NONE	2.89	3.15	3.02
TFSD	2.86	3.00	2.93
MEAN	2.87	3.08	2.98

INSCTCDE L FUNG	NONE	CYPERMET	MEAN
NONE	2.58	2.73	2.66
SPRAYS	3.16	3.43	3.30
MEAN	2.87	3.08	2.98

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	NONE	CYPERMET	MEAN
SPRING N			
120	2.82	3.01	2.91
180	2.93	3.14	3.04
MEAN	2.87	3.08	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	2.96	3.07	3.02
450	2.93	2.94	2.94
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	2.78	2.77	2.77
30+30	3.11	3.24	3.18
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	2.94	3.11	3.02
TFSD	2.95	2.91	2.93
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	2.60	2.72	2.66
SPRAYS	3.29	3.30	3.30
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
120	2.93	2.90	2.91
180	2.96	3.12	3.04
MEAN	2.94	3.01	2.98

GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	2.91	2.84	2.87
CYPERMET	2.98	3.17	3.08
MEAN	2.94	3.01	2.98

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N DIVX	30+30+120	180	MEAN
PRECROPX			
OATS	4.34	3.91	4.12
FALLOW	3.77	4.39	4.08
MEAN	4.06	4.15	4.10

E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	3.81	4.44	4.12
FALLOW	4.46	3.70	4.08
MEAN	4.14	4.07	4.10

E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+120	4.10	4.01	4.06
180	4.17	4.12	4.15
MEAN	4.14	4.07	4.10

	E FUNGX	NONE	TFSD
PRECROPX	N DIVX		
OATS	30+30+120	4.03	4.65
	180	3.58	4.23
FALLOW	30+30+120	4.17	3.37
	180	4.76	4.02

N DIVV	30+30+120	180	MEAN
PRECROPV			
BARLEY	3.52	2.74	3.13
OATS	3.90	4.06	3.98
MEAN	3.71	3.40	3.56

E FUNGV	NONE	TFSD	MEAN
PRECROPV			
BARLEY	2.56	3.71	3.13
OATS	3.69	4.27	3.98
MEAN	3.13	3.99	3.56

E FUNGV	NONE	TFSD	MEAN
N DIVV			
30+30+120	3.19	4.23	3.71
180	3.06	3.75	3.40
MEAN	3.13	3.99	3.56

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STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

PRECROPV	E FUNGV N DIVV	NONE	TFSD
BARLEY	30+30+120	2.77	4.26
	180	2.34	3.15
OATS	30+30+120	3.61	4.19
	180	3.77	4.35

EXTRA NO	SD 300	SD 450	MEAN
	1.57	1.37	1.47

GRAND MEAN 3.07

STRAW MEAN DM% 89.6

PLOT AREA HARVESTED 0.00249

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