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

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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.

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Design: Half replicate of (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

85/R/B/1

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 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 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)

85/R/B/1

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. Discd 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

85/R/B/1

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

85/R/B/1

GRAIN TONNES/HECTARE

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

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

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

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

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

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

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

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

85/R/B/1

GRAIN TONNES/HECTARE

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

GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	6.37	6.49	6.43
TFSD	6.69	6.75	6.72
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	5.85	5.99	5.92
SPRAYS	7.21	7.24	7.23
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
120	6.49	6.39	6.44
180	6.58	6.85	6.71
MEAN	6.53	6.62	6.58
GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	6.41	6.45	6.43
CYPERMET	6.65	6.79	6.72
MEAN	6.53	6.62	6.58
N DIVX	30+30+120	180	MEAN
PRECROPX			
OATS	8.85	8.36	8.61
FALLOW	7.65	8.67	8.16
MEAN	8.25	8.51	8.38
E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	8.36	8.85	8.61
FALLOW	8.29	8.03	8.16
MEAN	8.32	8.44	8.38
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+120	8.33	8.17	8.25
180	8.32	8.71	8.51
MEAN	8.32	8.44	8.38

85/R/B/1

GRAIN TONNES/HECTARE

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

	E FUNGX N DIVX	NONE	TFSD
PRECROPX 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		

85/R/B/1

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

85/R/B/1

STRAW TONNES/HECTARE

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

SPRING N	120	180	MEAN
WINTER N			
0	2.79	2.76	2.77
30+30	3.04	3.31	3.18
MEAN	2.91	3.04	2.98
SPRING N	120	180	MEAN
E FUNG			
NONE	2.90	3.14	3.02
TFSD	2.93	2.93	2.93
MEAN	2.91	3.04	2.98
SPRING N	120	180	MEAN
L FUNG			
NONE	2.73	2.58	2.66
SPRAYS	3.10	3.49	3.30
MEAN	2.91	3.04	2.98
INSC TCDE	NONE	CYPERMET	MEAN
SEEDRATE			
300	2.97	3.06	3.02
450	2.78	3.09	2.94
MEAN	2.87	3.08	2.98
INSC TCDE	NONE	CYPERMET	MEAN
WINTER N			
0	2.73	2.81	2.77
30+30	3.02	3.34	3.18
MEAN	2.87	3.08	2.98
INSC TCDE	NONE	CYPERMET	MEAN
E FUNG			
NONE	2.89	3.15	3.02
TFSD	2.86	3.00	2.93
MEAN	2.87	3.08	2.98
INSC TCDE	NONE	CYPERMET	MEAN
L FUNG			
NONE	2.58	2.73	2.66
SPRAYS	3.16	3.43	3.30
MEAN	2.87	3.08	2.98

85/R/B/1

STRAW TONNES/HECTARE

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

INSCDCE	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
TFSO	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
INSCDCE			
NONE	2.91	2.84	2.87
CYPERMET	2.98	3.17	3.08
MEAN	2.94	3.01	2.98

85/R/B/1

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

85/R/B/1

STRAW TONNES/HECTARE

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

	E FUNGV N DIVV	NONE	TFSD
PRECROPV 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		