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

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86/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 - Sawyers II.

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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 27 Nov, 1985, 30 on 10 Mar, 1986
3. SPRING N Rates of nitrogen fertilizer in spring (kg N) (as 'Nitro-Chalk' 26% N) on 11 Apr:
100
160
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 30 Apr, 1986. Carbendazim at 0.15 kg with maneb at 1.6 kg and tridemorph at 0.38 kg in 220 l on 16 May. Captafol at 1.3 kg and triadimefon at 0.12 kg in 220 l on 30 May
6. GRTH REG Growth regulator:
NONE None
CHLORMEQ Chloromequat applied at GS 21, 22, 31 at 0.51 kg in 220 l, on 12 Dec, 1985, 11 Mar, 1986 and 17 Apr

86/R/B/1

7. INSCTCDE Insecticide:
NONE None
CYPERMET Cypermethrin at 0.025 kg in 220 l on 25 Nov, 1985

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+100 30 on 27 Nov, 1985, 30 on 10 Mar, 1986 (both as prilled urea) plus 100 as 'Nitro-Chalk' (26% N) on 11 Apr
160 160 as 'Nitro-Chalk' (26% N) on 11 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+100 30 on 27 Nov, 1985, 30 on 10 Mar, 1986 (both as prilled urea) plus 100 as 'Nitro-Chalk' (26% N) on 11 Apr
160 160 as 'Nitro-Chalk' (26% N) on 11 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)

86/R/B/1

Basal applications: Manures: (0:18:36) at 280 kg. Weedkillers: Paraquat at 0.40 kg ion in 200 l. Isoproturon at 2.4 kg in 200 l. Dicamba, mecoprop and MCPA (as 'Herrisol' at 5.0 l) in 200 l. Growth regulators: Mepiquat chloride and 2-chloroethylphosphonic acid (as 'Terpal' at 2.0 l) with a wetting agent ('Citowett' at 0.08 l) in 200 l.

Cultivations, etc.: PK applied: 5 Sept, 1985. Paraquat applied: 18 Sept. Heavy spring-tine cultivated twice: 19 Sept. Rotary harrowed, subsoiled with 25 cm wide wings on tines 38 cm deep and 66 cm apart: 1 Oct. Rotary harrowed, seed sown: 2 Oct. Isoproturon applied: 6 Dec. 'Herrisol' applied, growth regulators with wetting agent applied: 2 May, 1986. Combine harvested: 1 Aug. Previous crops: W. wheat 1984, w. barley, w. oats, fallow 1985.

- NOTES: (1) Soil samples were taken in late October, mid-December and early February for amounts of nitrate and ammonium. Crop samples were taken from October to April for measurements of nitrate N concentration.
- (2) Plant samples were taken in March, April and June 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 early June to maturity to prevent damage by birds.

GRAIN TONNES/HECTARE

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

WINTER N SEEDRATE	0	30+30	MEAN
300	5.96	5.84	5.90
450	6.08	5.89	5.98
MEAN	6.02	5.86	5.94
E FUNG SEEDRATE	NONE	TFSD	MEAN
300	5.61	6.18	5.90
450	5.98	5.98	5.98
MEAN	5.80	6.08	5.94
E FUNG WINTER N	NONE	TFSD	MEAN
0	5.83	6.21	6.02
30+30	5.76	5.96	5.86
MEAN	5.80	6.08	5.94

86/R/B/1

GRAIN TONNES/HECTARE

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

L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	5.45	6.35	5.90
450	5.56	6.40	5.98
MEAN	5.51	6.37	5.94
L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	5.62	6.42	6.02
30+30	5.39	6.33	5.86
MEAN	5.51	6.37	5.94
L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	5.38	6.21	5.80
TFSD	5.63	6.53	6.08
MEAN	5.51	6.37	5.94
SPRING N	100	160	MEAN
SEEDRATE			
300	5.91	5.88	5.90
450	5.86	6.10	5.98
MEAN	5.89	5.99	5.94
SPRING N	100	160	MEAN
WINTER N			
0	6.00	6.03	6.02
30+30	5.77	5.95	5.86
MEAN	5.89	5.99	5.94
SPRING N	100	160	MEAN
E FUNG			
NONE	5.79	5.80	5.80
TFSD	5.98	6.18	6.08
MEAN	5.89	5.99	5.94
SPRING N	100	160	MEAN
L FUNG			
NONE	5.54	5.48	5.51
SPRAYS	6.24	6.51	6.37
MEAN	5.89	5.99	5.94

86/R/B/1

GRAIN TONNES/HECTARE

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

INSCTCDE	NONE	CYPERMET	MEAN
SEEDRATE			
300	6.01	5.79	5.90
450	5.92	6.04	5.98
MEAN	5.96	5.91	5.94
INSCTCDE	NONE	CYPERMET	MEAN
WINTER N			
0	6.06	5.97	6.02
30+30	5.87	5.86	5.86
MEAN	5.96	5.91	5.94
INSCTCDE	NONE	CYPERMET	MEAN
E FUNG			
NONE	5.86	5.73	5.80
TFSD	6.07	6.10	6.08
MEAN	5.96	5.91	5.94
INSCTCDE	NONE	CYPERMET	MEAN
L FUNG			
NONE	5.47	5.54	5.51
SPRAYS	6.46	6.29	6.37
MEAN	5.96	5.91	5.94
INSCTCDE	NONE	CYPERMET	MEAN
SPRING N			
100	6.04	5.73	5.89
160	5.89	6.09	5.99
MEAN	5.96	5.91	5.94
GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	5.97	5.83	5.90
450	5.91	6.05	5.98
MEAN	5.94	5.94	5.94
GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	6.00	6.03	6.02
30+30	5.88	5.85	5.86
MEAN	5.94	5.94	5.94

86/R/B/1

GRAIN TONNES/HECTARE

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

GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	5.82	5.78	5.80
TFSD	6.06	6.10	6.08
MEAN	5.94	5.94	5.94
GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	5.52	5.49	5.51
SPRAYS	6.36	6.39	6.37
MEAN	5.94	5.94	5.94
GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
100	5.91	5.86	5.89
160	5.97	6.01	5.99
MEAN	5.94	5.94	5.94
GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	5.90	6.03	5.96
CYPERMET	5.97	5.85	5.91
MEAN	5.94	5.94	5.94
N DIVX	30+30+100	160	MEAN
PRECROPX			
OATS	8.10	7.66	7.88
FALLOW	7.94	8.14	8.04
MEAN	8.02	7.90	7.96
E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	7.60	8.15	7.88
FALLOW	7.94	8.14	8.04
MEAN	7.77	8.15	7.96
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+100	7.70	8.34	8.02
160	7.84	7.95	7.90
MEAN	7.77	8.15	7.96

86/R/B/1

GRAIN TONNES/HECTARE

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

	E FUNGX N DIVX	NONE	TFSD
PRECROPX OATS	30+30+100	7.94	8.26
	160	7.27	8.05
FALLOW	30+30+100	7.47	8.42
	160	8.42	7.86
N DIVV	30+30+100	160	MEAN
PRECROPV BARLEY	6.58	6.60	6.59
OATS	8.25	8.26	8.26
MEAN	7.41	7.43	7.42
E FUNGV	NONE	TFSD	MEAN
PRECROPV BARLEY	6.13	7.05	6.59
OATS	8.19	8.33	8.26
MEAN	7.16	7.69	7.42
E FUNGV	NONE	TFSD	MEAN
N DIVV			
30+30+100	6.87	7.95	7.41
160	7.44	7.42	7.43
MEAN	7.16	7.69	7.42
PRECROPV	E FUNGV N DIVV	NONE	TFSD
BARLEY	30+30+100	5.61	7.55
	160	6.65	6.54
OATS	30+30+100	8.13	8.36
	160	8.24	8.29

EXTRA NO	SD 300	SD 450	MEAN
	3.89	4.62	4.26

GRAND MEAN 6.19

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

(NOT INCLUDING EXTRA PLOTS)
MARGIN OF TWO FACTOR TABLES 0.120
TWO FACTOR TABLES 0.170

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.481	8.1
GRAIN MEAN DM%	84.6		

86/R/B/1

STRAW TONNES/HECTARE

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

WINTER N	0	30+30	MEAN
SEEDRATE			
300	3.62	3.69	3.65
450	3.63	3.65	3.64
MEAN	3.63	3.67	3.65
E FUNG	NONE	TFSD	MEAN
SEEDRATE			
300	3.52	3.79	3.65
450	3.55	3.74	3.64
MEAN	3.53	3.77	3.65
E FUNG	NONE	TFSD	MEAN
WINTER N			
0	3.51	3.74	3.63
30+30	3.56	3.79	3.67
MEAN	3.53	3.77	3.65
L FUNG	NONE	SPRAYS	MEAN
SEEDRATE			
300	3.44	3.87	3.65
450	3.31	3.98	3.64
MEAN	3.37	3.93	3.65
L FUNG	NONE	SPRAYS	MEAN
WINTER N			
0	3.38	3.87	3.63
30+30	3.36	3.98	3.67
MEAN	3.37	3.93	3.65
L FUNG	NONE	SPRAYS	MEAN
E FUNG			
NONE	3.27	3.79	3.53
TFSD	3.47	4.06	3.77
MEAN	3.37	3.93	3.65
SPRING N	100	160	MEAN
SEEDRATE			
300	3.70	3.60	3.65
450	3.64	3.65	3.64
MEAN	3.67	3.63	3.65
SPRING N	100	160	MEAN
WINTER N			
0	3.67	3.58	3.63
30+30	3.67	3.67	3.67
MEAN	3.67	3.63	3.65

86/R/B/1

STRAW TONNES/HECTARE

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

SPRING N	100	160	MEAN
E FUNG			
NONE	3.66	3.40	3.53
TFSD	3.68	3.85	3.77
MEAN	3.67	3.63	3.65

SPRING N	100	160	MEAN
L FUNG			
NONE	3.44	3.30	3.37
SPRAYS	3.90	3.95	3.93
MEAN	3.67	3.63	3.65

IN SCTCDE	NONE	CYPERMET	MEAN
SEEDRATE			
300	3.58	3.72	3.65
450	3.60	3.69	3.64
MEAN	3.59	3.70	3.65

IN SCTCDE	NONE	CYPERMET	MEAN
WINTER N			
0	3.61	3.64	3.63
30+30	3.58	3.77	3.67
MEAN	3.59	3.70	3.65

IN SCTCDE	NONE	CYPERMET	MEAN
E FUNG			
NONE	3.48	3.58	3.53
TFSD	3.70	3.83	3.77
MEAN	3.59	3.70	3.65

IN SCTCDE	NONE	CYPERMET	MEAN
L FUNG			
NONE	3.27	3.48	3.37
SPRAYS	3.92	3.93	3.93
MEAN	3.59	3.70	3.65

IN SCTCDE	NONE	CYPERMET	MEAN
SPRING N			
100	3.66	3.68	3.67
160	3.52	3.73	3.63
MEAN	3.59	3.70	3.65

GRTH REG	NONE	CHLORMEQ	MEAN
SEEDRATE			
300	3.56	3.74	3.65
450	3.47	3.82	3.64
MEAN	3.51	3.78	3.65

86/R/B/1

STRAW TONNES/HECTARE

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

GRTH REG	NONE	CHLORMEQ	MEAN
WINTER N			
0	3.51	3.75	3.63
30+30	3.52	3.82	3.67
MEAN	3.51	3.78	3.65
GRTH REG	NONE	CHLORMEQ	MEAN
E FUNG			
NONE	3.38	3.68	3.53
TFSD	3.65	3.89	3.77
MEAN	3.51	3.78	3.65
GRTH REG	NONE	CHLORMEQ	MEAN
L FUNG			
NONE	3.29	3.45	3.37
SPRAYS	3.73	4.12	3.93
MEAN	3.51	3.78	3.65
GRTH REG	NONE	CHLORMEQ	MEAN
SPRING N			
100	3.56	3.78	3.67
160	3.46	3.79	3.63
MEAN	3.51	3.78	3.65
GRTH REG	NONE	CHLORMEQ	MEAN
INSCTCDE			
NONE	3.39	3.80	3.59
CYPERMET	3.64	3.77	3.70
MEAN	3.51	3.78	3.65
N DIVX	30+30+100	160	MEAN
PRECROPX			
OATS	3.85	4.17	4.01
FALLOW	4.50	4.58	4.54
MEAN	4.18	4.38	4.28
E FUNGX	NONE	TFSD	MEAN
PRECROPX			
OATS	4.05	3.98	4.01
FALLOW	4.52	4.56	4.54
MEAN	4.28	4.27	4.28
E FUNGX	NONE	TFSD	MEAN
N DIVX			
30+30+100	4.14	4.21	4.18
160	4.43	4.33	4.38
MEAN	4.28	4.27	4.28

86/R/B/1

STRAW TONNES/HECTARE

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

	E FUNGX	NONE	TFSD
PRECROPX	N DIVX		
OATS	30+30+100	4.02	3.68
	160	4.07	4.28
FALLOW	30+30+100	4.25	4.75
	160	4.80	4.37
N DIVV	30+30+100	160	MEAN
PRECROPV			
BARLEY	4.00	4.10	4.05
OATS	3.77	3.99	3.88
MEAN	3.88	4.05	3.97
E FUNGV	NONE	TFSD	MEAN
PRECROPV			
BARLEY	3.92	4.18	4.05
OATS	4.01	3.75	3.88
MEAN	3.96	3.97	3.97
E FUNGV	NONE	TFSD	MEAN
N DIVV			
30+30+100	4.04	3.73	3.88
160	3.88	4.21	4.05
MEAN	3.96	3.97	3.97
	E FUNGV	NONE	TFSD
PRECROPV	N DIVV		
BARLEY	30+30+100	4.18	3.83
	160	3.66	4.54
OATS	30+30+100	3.91	3.63
	160	4.11	3.87
EXTRA NO	SD 300	SD 450	MEAN
	1.49	1.54	1.52
GRAND MEAN	3.64		
STRAW MEAN DM%	82.4		
PLOT AREA HARVESTED	0.00247		