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

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83/R/B/1

WINTER BARLEY

FACTORS LIMITING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the growth and yield of w. barley - Long Hoos I/II.

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

Design: Half replicate of 2^7 in 2 blocks of 32 plots + 2 extra plots in each block.

Whole plot dimensions: 3.0 x 15.2.

Treatments: Combinations of:-

- | | |
|-------------|---|
| 1. SOWDATE | Dates of sowing: |
| 15 SEP | 15 September, 1982 |
| 26 OCT | 26 October |
| 2. N RATE | Rates of nitrogen fertilizer (kg N) as 'Nitro-Chalk': |
| 100 | |
| 150 | |
| 3. N TIME | Times of applying nitrogen fertilizer: |
| 10 MAR | 10 March, 1983 |
| 12 APR | 12 April |
| 4. AUT PEST | Autumn pesticide to seedbed: |
| NONE | None |
| ALDICARB | Aldicarb at 7.1 kg |
| 5. E FUNG | Early fungicides: |
| NONE | None |
| TFSD | Triadimenol and fuberidazole seed dressing |
| 6. L FUNG | Late fungicides: |
| NONE | None |
| TR+CA+MA | Tridemorph at 0.70 kg in 450 l on 21 Jan 1983, and at 0.70 kg in 220 l on 18 Mar. Carbendazim at 0.15 kg, maneb at 1.6 kg and tridemorph at 0.38 kg in 220 l on 26 Apr and 23 May |
| 7. GRTH REG | Growth regulator: |
| NONE | None |
| MEP+ETH | Mepiquat chloride + ethephon (as 'Terpal' at 2.8 l) in 220 l |

83/R/B/1

plus two extra treatments given no nitrogen fertilizer, pesticides, fungicides or growth regulator:

EXTRA

| | |
|----------|-------------------|
| 15 SEP 0 | Sown 15 September |
| 26 OCT 0 | Sown 26 October |

- NOTE: (1) Aldicarb was applied before sowing on each occasion, and worked in by a rotary harrow seed drill combination.
(2) The growth regulator was applied at the recommended growth stage (Zadoks 31/32) which occurred on 27 April for the first sowing, and 11 May for the second.

Basal applications: Manures: (0:18:36) at 280 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 450 l on SOWDATE 15 SEP plots and again (as 'Brittox' at 1.76 l) with mecoprop (as 'Farmon CMPP' at 2.1 l) in 220 l on SOWDATE 26 OCT plots.

Seed: Igrí, sown at 130 kg.

Cultivations, etc.: - PK applied: 10 Sept, 1982. Heavy spring-tine cultivated twice: 13 Sept. Aldicarb applied to SOWDATE 15 SEP, rotary harrowed, seed sown: 15 Sept. Aldicarb applied to SOWDATE 26 OCT: 20 Oct. These plots rotary harrowed, seed sown: 26 Oct. 'Brittox' applied to SOWDATE 15 SEP plots: 26 Nov. 'Brittox' with 'Farmon CMPP' applied to SOWDATE 26 OCT: 28 Mar, 1983. Combine harvested: 26 July. Previous crops: W. oats 1981, potatoes 1982.

- NOTES: (1) Stem nitrate and nitrate in the soil were measured on several occasions during the season. Plant counts were taken and leaf diseases were assessed periodically. Crop height and ear numbers were measured in June and blind spikelets were assessed during the season.
(2) A cage was erected over the crop from late May to maturity to prevent damage by birds.

83/R/B/1

GRAIN TONNES/HECTARE

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

| | | | |
|----------|--------|----------|------|
| N RATE | 100 | 150 | MEAN |
| SOWDATE | | | |
| 15 SEPT | 7.92 | 7.84 | 7.88 |
| 26 OCT | 7.64 | 7.75 | 7.70 |
| MEAN | 7.78 | 7.79 | 7.79 |
| N TIME | 10 MAR | 12 APR | MEAN |
| SOWDATE | | | |
| 15 SEPT | 7.73 | 8.03 | 7.88 |
| 26 OCT | 7.67 | 7.73 | 7.70 |
| MEAN | 7.70 | 7.88 | 7.79 |
| N TIME | 10 MAR | 12 APR | MEAN |
| N RATE | | | |
| 100 | 7.76 | 7.81 | 7.78 |
| 150 | 7.64 | 7.94 | 7.79 |
| MEAN | 7.70 | 7.88 | 7.79 |
| AUT PEST | NONE | ALDICARB | MEAN |
| SOWDATE | | | |
| 15 SEPT | 7.72 | 8.04 | 7.88 |
| 26 OCT | 7.66 | 7.74 | 7.70 |
| MEAN | 7.69 | 7.89 | 7.79 |
| AUT PEST | NONE | ALDICARB | MEAN |
| N RATE | | | |
| 100 | 7.68 | 7.89 | 7.78 |
| 150 | 7.71 | 7.88 | 7.79 |
| MEAN | 7.69 | 7.89 | 7.79 |
| AUT PEST | NONE | ALDICARB | MEAN |
| N TIME | | | |
| 10 MAR | 7.62 | 7.78 | 7.70 |
| 12 APR | 7.76 | 7.99 | 7.88 |
| MEAN | 7.69 | 7.89 | 7.79 |
| E FUNG | NONE | TFSD | MEAN |
| SOWDATE | | | |
| 15 SEPT | 7.71 | 8.05 | 7.88 |
| 26 OCT | 7.68 | 7.71 | 7.70 |
| MEAN | 7.70 | 7.88 | 7.79 |

83/R/B/1

GRAIN TONNES/HECTARE

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

| | | | |
|----------|------|----------|------|
| E FUNG | NONE | TFSD | MEAN |
| N RATE | | | |
| 100 | 7.65 | 7.92 | 7.78 |
| 150 | 7.74 | 7.85 | 7.79 |
| MEAN | 7.70 | 7.88 | 7.79 |
| E FUNG | NONE | TFSD | MEAN |
| N TIME | | | |
| 10 MAR | 7.59 | 7.81 | 7.70 |
| 12 APR | 7.80 | 7.95 | 7.88 |
| MEAN | 7.70 | 7.88 | 7.79 |
| E FUNG | NONE | TFSD | MEAN |
| AUT PEST | | | |
| NONE | 7.56 | 7.82 | 7.69 |
| ALDICARB | 7.83 | 7.94 | 7.89 |
| MEAN | 7.70 | 7.88 | 7.79 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| SOWDATE | | | |
| 15 SEPT | 7.37 | 8.39 | 7.88 |
| 26 OCT | 7.32 | 8.07 | 7.70 |
| MEAN | 7.35 | 8.23 | 7.79 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| N RATE | | | |
| 100 | 7.41 | 8.16 | 7.78 |
| 150 | 7.28 | 8.31 | 7.79 |
| MEAN | 7.35 | 8.23 | 7.79 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| N TIME | | | |
| 10 MAR | 7.22 | 8.18 | 7.70 |
| 12 APR | 7.47 | 8.29 | 7.88 |
| MEAN | 7.35 | 8.23 | 7.79 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| AUT PEST | | | |
| NONE | 7.31 | 8.07 | 7.69 |
| ALDICARB | 7.38 | 8.39 | 7.89 |
| MEAN | 7.35 | 8.23 | 7.79 |

83/R/B/1

GRAIN TONNES/HECTARE

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

| | | | |
|----------|------|----------|------|
| L FUNG | NONE | TR+CA+MA | MEAN |
| E FUNG | | | |
| NONE | 7.28 | 8.11 | 7.70 |
| TFSD | 7.41 | 8.35 | 7.88 |
| MEAN | 7.35 | 8.23 | 7.79 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| SOWDATE | | | |
| 15 SEPT | 7.78 | 7.98 | 7.88 |
| 26 OCT | 7.41 | 7.98 | 7.70 |
| MEAN | 7.60 | 7.98 | 7.79 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| N RATE | | | |
| 100 | 7.71 | 7.86 | 7.78 |
| 150 | 7.48 | 8.10 | 7.79 |
| MEAN | 7.60 | 7.98 | 7.79 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| N TIME | | | |
| 10 MAR | 7.54 | 7.86 | 7.70 |
| 12 APR | 7.65 | 8.10 | 7.88 |
| MEAN | 7.60 | 7.98 | 7.79 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| AUT PEST | | | |
| NONE | 7.52 | 7.86 | 7.69 |
| ALDICARB | 7.67 | 8.10 | 7.89 |
| MEAN | 7.60 | 7.98 | 7.79 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| E FUNG | | | |
| NONE | 7.59 | 7.81 | 7.70 |
| TFSD | 7.60 | 8.16 | 7.88 |
| MEAN | 7.60 | 7.98 | 7.79 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| L FUNG | | | |
| NONE | 7.18 | 7.51 | 7.35 |
| TR+CA+MA | 8.01 | 8.45 | 8.23 |
| MEAN | 7.60 | 7.98 | 7.79 |

83/R/B/1

GRAIN TONNES/HECTARE

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

| | | | |
|------------|----------|----------|------|
| EXTRA | 15 SEP 0 | 26 OCT 0 | MEAN |
| | 4.98 | 4.10 | 4.54 |
| GRAND MEAN | 7.60 | | |

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

(NOT INCLUDING EXTRA PLOTS)
 MARGIN OF TWO FACTOR TABLES 0.072
 TWO FACTOR TABLES 0.102

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

| STRATUM | DF | SE | CV% |
|----------------|------|-------|-----|
| BLOCK.WP | 34 | 0.290 | 3.7 |
| GRAIN MEAN DM% | 86.2 | | |

STRAW TONNES/HECTARE

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

| | | | |
|----------|--------|----------|------|
| N RATE | 100 | 150 | MEAN |
| SOWDATE | | | |
| 15 SEPT | 5.54 | 6.27 | 5.91 |
| 26 OCT | 4.93 | 5.89 | 5.41 |
| MEAN | 5.24 | 6.08 | 5.66 |
| N TIME | 10 MAR | 12 APR | MEAN |
| SOWDATE | | | |
| 15 SEPT | 6.20 | 5.62 | 5.91 |
| 26 OCT | 5.62 | 5.21 | 5.41 |
| MEAN | 5.91 | 5.41 | 5.66 |
| N TIME | 10 MAR | 12 APR | MEAN |
| N RATE | | | |
| 100 | 5.49 | 4.99 | 5.24 |
| 150 | 6.33 | 5.84 | 6.08 |
| MEAN | 5.91 | 5.41 | 5.66 |
| AUT PEST | NONE | ALDICARB | MEAN |
| SOWDATE | | | |
| 15 SEPT | 5.80 | 6.01 | 5.91 |
| 26 OCT | 5.49 | 5.34 | 5.41 |
| MEAN | 5.64 | 5.68 | 5.66 |

83/R/B/1

STRAW TONNES/HECTARE

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

| | | | |
|----------|------|----------|------|
| AUT PEST | NONE | ALDICARB | MEAN |
| N RATE | | | |
| 100 | 5.17 | 5.31 | 5.24 |
| 150 | 6.12 | 6.04 | 6.08 |
| MEAN | 5.64 | 5.68 | 5.66 |
| AUT PEST | NONE | ALDICARB | MEAN |
| N TIME | | | |
| 10 MAR | 5.93 | 5.89 | 5.91 |
| 12 APR | 5.36 | 5.47 | 5.41 |
| MEAN | 5.64 | 5.68 | 5.66 |
| E FUNG | NONE | TFSD | MEAN |
| SOWDATE | | | |
| 15 SEPT | 5.69 | 6.12 | 5.91 |
| 26 OCT | 5.42 | 5.40 | 5.41 |
| MEAN | 5.56 | 5.76 | 5.66 |
| E FUNG | NONE | TFSD | MEAN |
| N RATE | | | |
| 100 | 5.12 | 5.35 | 5.24 |
| 150 | 5.99 | 6.17 | 6.08 |
| MEAN | 5.56 | 5.76 | 5.66 |
| E FUNG | NONE | TFSD | MEAN |
| N TIME | | | |
| 10 MAR | 5.82 | 6.00 | 5.91 |
| 12 APR | 5.30 | 5.53 | 5.41 |
| MEAN | 5.56 | 5.76 | 5.66 |
| E FUNG | NONE | TFSD | MEAN |
| AUT PEST | | | |
| NONE | 5.56 | 5.73 | 5.64 |
| ALDICARB | 5.56 | 5.79 | 5.68 |
| MEAN | 5.56 | 5.76 | 5.66 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| SOWDATE | | | |
| 15 SEPT | 5.74 | 6.07 | 5.91 |
| 26 OCT | 5.19 | 5.64 | 5.41 |
| MEAN | 5.46 | 5.85 | 5.66 |

83/R/B/1

STRAW TONNES/HECTARE

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

| | | | |
|----------|------|----------|------|
| L FUNG | NONE | TR+CA+MA | MEAN |
| N RATE | | | |
| 100 | 4.98 | 5.49 | 5.24 |
| 150 | 5.95 | 6.22 | 6.08 |
| MEAN | 5.46 | 5.85 | 5.66 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| N TIME | | | |
| 10 MAR | 5.73 | 6.08 | 5.91 |
| 12 APR | 5.20 | 5.63 | 5.41 |
| MEAN | 5.46 | 5.85 | 5.66 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| AUT PEST | | | |
| NONE | 5.50 | 5.79 | 5.64 |
| ALDICARB | 5.43 | 5.92 | 5.68 |
| MEAN | 5.46 | 5.85 | 5.66 |
| L FUNG | NONE | TR+CA+MA | MEAN |
| E FUNG | | | |
| NONE | 5.32 | 5.80 | 5.56 |
| TFSD | 5.61 | 5.91 | 5.76 |
| MEAN | 5.46 | 5.85 | 5.66 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| SOWDATE | | | |
| 15 SEPT | 6.12 | 5.70 | 5.91 |
| 26 OCT | 5.75 | 5.08 | 5.41 |
| MEAN | 5.93 | 5.39 | 5.66 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| N RATE | | | |
| 100 | 5.46 | 5.01 | 5.24 |
| 150 | 6.41 | 5.76 | 6.08 |
| MEAN | 5.93 | 5.39 | 5.66 |
| GRTH REG | NONE | MEP+ETH | MEAN |
| N TIME | | | |
| 10 MAR | 6.18 | 5.63 | 5.91 |
| 12 APR | 5.68 | 5.14 | 5.41 |
| MEAN | 5.93 | 5.39 | 5.66 |

83/R/B/1

STRAW TONNES/HECTARE

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

| GRTH REG AUT PEST | NONE | MEP+ETH | MEAN |
|----------------------|------|---------|------|
| NONE | 5.89 | 5.39 | 5.64 |
| ALDICARB | 5.97 | 5.38 | 5.68 |
| MEAN | 5.93 | 5.39 | 5.66 |

| GRTH REG E FUNG | NONE | MEP+ETH | MEAN |
|--------------------|------|---------|------|
| NONE | 5.90 | 5.21 | 5.56 |
| TFSD | 5.96 | 5.56 | 5.76 |
| MEAN | 5.93 | 5.39 | 5.66 |

| GRTH REG L FUNG | NONE | MEP+ETH | MEAN |
|--------------------|------|---------|------|
| NONE | 5.73 | 5.20 | 5.46 |
| TR+CA+MA | 6.14 | 5.57 | 5.85 |
| MEAN | 5.93 | 5.39 | 5.66 |

| EXTRA | 15 SEP 0 | 26 OCT 0 | MEAN |
|-------|----------|----------|------|
| | 3.15 | 2.05 | 2.60 |

GRAND MEAN 5.48

STRAW MEAN DM% 86.1

PLOT AREA HARVESTED 0.00341