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# Yields of the Field Experiments 1971

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## Barley

### Rothamsted Research

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71/R/B/1 and 71/BB/B/1

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 71/R&BB/WW/6)- Rothamsted (R) Great Knott III and Broom's Barn (BB) Marl Pit Field.

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

Whole plot dimensions:-

Great Knott III (R): 15.2 x 48.0. Sub plot area harvested: 0.00434.  
Marl Pit Field (BB): 15.2 x 45.7. Sub plot area harvested: 0.00413.

Treatments: All combinations of:-

Whole plots: 1. Irrigation: None (0), full irrigation (I).

Sub plots: 2. Nitrogen: 31, 63, 94, 125, 157, 188 kg N as 'Nitro-Chalk'.

Total irrigation was 33.0 mm applied on two occasions (R) and 58.4 mm applied on three occasions (BB).

Basal applications:

Great Knott III (R): 1260 kg (0:20:20) plus 900 kg Epsom salts ploughed in in autumn, 360 kg (0:20:20) combine drilled.

Marl Pit Field (BB): 1260 kg (0:20:20) plus 900 kg Epsom salts ploughed in in autumn 251 kg (0:20:20) combine drilled.

Weedkiller (both fields): MCPA, mecoprop and dicamba ('Banlene Plus' at 5.6 l in 225 l).

Fungicide (both fields): Tridemorph at 0.53 kg applied with the weedkiller.

Weedkiller to Great Knott III (R) only: Paraquat at 0.56 kg ion in 225 l.

Cultivations, etc.:

Great Knott III (R): Basal PK and Epsom salts applied:

15 Sept, 1970. Paraquat applied: 14 Oct. Ploughed:

2 - 10 Nov. N applied, seed combine drilled at 180 kg:

11 Mar, 1971. Weedkiller plus fungicide applied: 10 May.

Irrigated: 20 May - 5.1 mm, 8 June - 27.9 mm. Combine

harvested: 18 Aug. Variety: Julia. Previous crops:

Potatoes 1969, winter wheat 1970.

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Marl Pit Field (BB): Basal PK applied: 18 Sept, 1970. Epsom salts applied: 16 Oct. Ploughed: 20 Oct. Seed combine drilled at 180 kg: 5 Mar, 1971. N applied: 23 Mar. Weedkiller plus fungicide applied: 10 May. Irrigated: 14 May - 26.7 mm, 21 May - 16.5 mm, 26 May - 15.2 mm. Combine harvested: 12 Aug. Variety: Julia. Previous crops: Sugar beet 1969, barley 1970.

Standard errors per plot. Grain, tonnes/hectare:

Great Knott III (R): Sub plot: 0.303 or 4.8% (20 d.f.)

Marl Pit Field (BB): Sub plot: 0.266 or 4.9% (20 d.f.)

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SUMMARY OF RESULTS

GREAT KNOTT III (R)

N: KG/HA

|               | 31                    | 63   | 94   | 125  | 157  | 188  | Mean |
|---------------|-----------------------|------|------|------|------|------|------|
|               | GRAIN: TONNES/HECTARE |      |      |      |      |      |      |
|               | (±0.175)*             |      |      |      |      |      |      |
| O             | 5.65                  | 6.40 | 6.71 | 6.64 | 6.64 | 6.21 | 6.37 |
| I             | 5.36                  | 6.42 | 6.56 | 6.60 | 6.85 | 6.19 | 6.33 |
| Mean (±0.124) | 5.50                  | 6.41 | 6.64 | 6.62 | 6.75 | 6.20 | 6.35 |

STRAW: TONNES/HECTARE

|      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| O    | 3.25 | 5.35 | 5.60 | 5.77 | 5.90 | 5.58 | 5.24 |
| I    | 3.61 | 5.11 | 5.89 | 5.65 | 6.34 | 5.88 | 5.41 |
| Mean | 3.43 | 5.23 | 5.74 | 5.71 | 6.12 | 5.73 | 5.33 |

Mean D.M. %: Grain: 83.5  
Straw: 77.6

\* For use in horizontal and interaction comparisons only

71/R/B/1 and 71/BB/B/1

MARL PIT FIELD (BB)

N: KG/HA

|                       | 31   | 63   | 94   | 125  | 157  | 188  | Mean |
|-----------------------|------|------|------|------|------|------|------|
| GRAIN: TONNES/HECTARE |      |      |      |      |      |      |      |
| ( $\pm 0.154$ )*      |      |      |      |      |      |      |      |
| O                     | 4.07 | 4.99 | 5.37 | 5.85 | 5.90 | 5.77 | 5.33 |
| I                     | 4.76 | 5.34 | 6.01 | 5.93 | 6.11 | 5.56 | 5.62 |
| Mean ( $\pm 0.109$ )  | 4.41 | 5.16 | 5.69 | 5.89 | 6.00 | 5.67 | 5.47 |
| STRAW: TONNES/HECTARE |      |      |      |      |      |      |      |
| O                     | 3.30 | 4.28 | 4.81 | 5.56 | 5.72 | 6.08 | 4.96 |
| I                     | 3.97 | 5.04 | 6.08 | 6.25 | 6.72 | 6.36 | 5.74 |
| Mean                  | 3.63 | 4.66 | 5.45 | 5.91 | 6.22 | 6.22 | 5.35 |

Mean D.M. %: Grain: 82.7  
Straw: 82.8

\* For use in horizontal and interaction comparisons only

71/R/B/2 and 71/W/B/2

BARLEY

VARIETIES, N AND ETHIRIMOL

Object: To study the yield of newer varieties of barley grown at a range of nitrogen levels. The effects of ethirimol on the incidence of mildew (*Erysiphe graminis*) are also studied - Rothamsted (R) Great Knott III and Woburn (W) Horsepool.

Design: 4 randomised blocks of 12 plots, split into 3.

Whole plot dimensions:-

Great Knott III (R): 4.27 x 24.7. Sub plot area harvested: 0.00163.  
Horsepool (W): 4.27 x 20.1. Sub plot area harvested: 0.00173.

Treatments:

Whole plots: All combinations of:-

1. Varieties: Gerkra (G), Julia (J), Midas (M), Sultan (S), Vada (V), Zephyr (Z).
2. Fungicidal seed dressing: None (O), ethirimol at 0.70 kg (F).

Sub plots:

3. Nitrogen: 38, 75, 113 kg (R) and 50, 100, 150 kg (W) as 'Nitro-Chalk'.

Basal applications:-

Great Knott III (R): 246 kg (0:20:20) combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 225 l. Ioxynil octanoate, bromoxynil octanoate and the iso-octyl ester of dichlorpop ('Oxytril P' at 1.4 l in 225 l).

Horsepool (W): 252 kg (0:20:20) combine drilled. Weedkillers: Paraquat at 0.84 kg ion in 281 l (to kill remains of first sowing badly damaged by birds). Ioxynil at 0.525 kg plus mecoprop at 1.58 kg in 281 l.

Cultivations, etc.:-

Great Knott III (R): Paraquat applied: 14 Oct, 1970. Ploughed: 2 - 10 Nov. Seed combine drilled at 157 kg: 10 Mar, 1971. N applied: 23 Mar. 'Oxytril P' applied: 11 May. Combine harvested: 20 Aug. Previous crops: Potatoes 1969, winter wheat 1970.

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Horsepool (W): Subsoiled, tines 142 cm apart, 61 cm deep:  
11 Sept, 1970. Rotary cultivated: 15 Sept. Rotary cultivated  
second stroke: 2 Oct. Deep-tine cultivated: 11 Oct. Seed  
combine drilled at 157 kg: 23 Mar, 1971. N applied: 24 Mar.  
Paraquat applied: 20 Apr. Power harrowed, seed redrilled at  
157 kg: 21 Apr. Ioxynil/mecoprop applied: 17 May. Combine  
harvested: 25 Aug. Previous crops: Spring beans 1969, winter  
wheat 1970.

NOTE: Samples were taken for assessment of mildew (*Erysiphe graminis*)  
and other foliar diseases.

Standard errors per plot. Grain, tonnes/hectare.

|                      |             |               |           |
|----------------------|-------------|---------------|-----------|
| Great Knott III (R): | Whole plot: | 0.195 or 3.5% | (33 d.f.) |
|                      | Sub plot:   | 0.330 or 5.9% | (72 d.f.) |
| Horsepool (W):       | Whole plot: | 0.307 or 6.6% | (33 d.f.) |
|                      | Sub plot:   | 0.374 or 8.1% | (72 d.f.) |

71/R/B/2 and 71/W/B/2

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

GREAT KNOTT III (R)

|               | G           | J    | M    | S    | V    | Z    | Mean     |
|---------------|-------------|------|------|------|------|------|----------|
|               | (±0.098)    |      |      |      |      |      | (±0.040) |
| O             | 5.16        | 5.65 | 4.85 | 5.10 | 5.97 | 5.15 | 5.32     |
| F             | 5.67        | 6.45 | 5.31 | 5.47 | 6.56 | 5.84 | 5.88     |
| N: KG/HA      | (1) and (2) |      |      |      |      |      | (±0.048) |
| 38            | 5.01        | 5.57 | 4.71 | 5.10 | 5.63 | 5.01 | 5.17     |
| 75            | 5.54        | 6.24 | 5.18 | 5.48 | 6.58 | 5.68 | 5.78     |
| 113           | 5.70        | 6.34 | 5.35 | 5.27 | 6.60 | 5.80 | 5.84     |
| Mean (±0.069) | 5.42        | 6.05 | 5.08 | 5.28 | 6.27 | 5.49 | 5.60     |

N: KG/HA

|   | 38          | 75   | 113  |
|---|-------------|------|------|
|   | (3) and (4) |      |      |
| O | 4.97        | 5.40 | 5.58 |
| F | 5.37        | 6.17 | 6.11 |

(1) (±0.117) (3) (±0.068) For use in vertical and diagonal comparisons only

(2) (±0.118) (4) (±0.067) For use in horizontal and interaction comparisons only

Mean D.M. %: 81.5

71/R/B/2 and 71/W/B/2

GRAIN: TONNES/HECTARE

HORSEPOOL (W)

|               | G           | J    | M    | S    | V    | Z    | Mean     |
|---------------|-------------|------|------|------|------|------|----------|
|               | (±0.154)    |      |      |      |      |      | (±0.063) |
| O             | 4.67        | 4.56 | 3.82 | 3.38 | 5.59 | 4.14 | 4.36     |
| F             | 4.86        | 4.78 | 4.48 | 4.51 | 6.00 | 4.88 | 4.92     |
| N: KG/HA      | (1) and (2) |      |      |      |      |      | (±0.054) |
| 50            | 4.86        | 5.06 | 4.60 | 4.26 | 5.72 | 4.75 | 4.88     |
| 100           | 4.83        | 4.79 | 4.10 | 3.94 | 5.77 | 4.64 | 4.68     |
| 150           | 4.61        | 4.16 | 3.75 | 3.63 | 5.90 | 4.15 | 4.37     |
| Mean (±0.109) | 4.77        | 4.67 | 4.15 | 3.94 | 5.80 | 4.51 | 4.64     |

N: KG/HA

|   | 50          | 100  | 150  |
|---|-------------|------|------|
|   | (3) and (4) |      |      |
| O | 4.59        | 4.38 | 4.11 |
| F | 5.16        | 4.97 | 4.62 |

(1) (±0.132) (3) (±0.088) For use in vertical and diagonal comparisons only

(2) (±0.153) (4) (±0.076) For use in horizontal and interaction comparisons only

Mean D.M. %: 82.3

## 71/R/B/3 and 71/W/B/3

### BARLEY

#### RATES, FORMS AND METHODS OF APPLYING N

Object: To study the effects of urea, liquid or solid, broadcast or injected, on the yields of barley - Rothamsted, Great Knott III (R) and Woburn, Horsepool (W).

Design: Great Knott III (R): 4 randomised blocks of 14 plots.  
Horsepool (W): 3 randomised blocks of 14 plots.

Whole plot dimensions: 2.13 x 30.5. Area harvested: 0.00650.

Treatments: No nitrogen (2 plots per block) (NO) and all combinations of:-

1. Forms of nitrogen: 'Nitro-Chalk' 21% N (NC). Solid (prilled) urea 46% N (SU). Urea solution 18% N (LU).
2. Methods of applying nitrogen: Injected (I), broadcast (sprayed for LU treatment) (B).
3. Rates of nitrogen: 63 kg, 126 kg.

Basal applications: 250 kg (0:20:20) broadcast by drill. Weedkillers:-

Great Knott III (R): Paraquat at 0.56 kg ion in 225 l. Ioxynil octanoate, bromoxynil octanoate and the iso-octyl ester of dichlorprop ('Oxytril P' at 1.4 l in 225 l).  
Horsepool (W): Ioxynil at 0.53 g and mecoprop at 1.58 kg in 281 l.

Cultivations, etc.:-

Great Knott III (R): Paraquat applied: 14 Oct, 1970. Ploughed: 2 - 10 Nov. Basal PK applied: 24 Feb, 1971. Treatments applied, seed drilled at 157 kg: 27 Feb. 'Oxytril P' applied: 11 May. Combine harvested: Aug 18. Variety: Julia. Previous crops: Potatoes 1969, winter wheat 1970.

Horsepool (W): Sub-soiled 142 cm wide by 61 cm deep: 11 Sept, 1970. Rotary cultivated 1st stroke: 15 - 17 Sept, 2nd stroke: 2 - 3 Oct. Deep-tine cultivated: 11 Oct. Treatments and basal PK applied, seed drilled at 157 kg: 26 Feb, 1971. Weedkiller applied: 11 May. Combine harvested: 17 Aug. Variety: Julia. Previous crops: Spring beans 1969, winter wheat 1970.

Standard errors per plot. Grain, tonnes/hectare.

Great Knott III (R): 0.195 or 3.3% (33 d.f.)  
Horsepool (W): 0.288 or 5.0% (22 d.f.)

71/R/B/3 and 71/W/B/3

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

GREAT KNIGHT III (R)

N: KG/HA

|               | I        | B    | 63       | 126  | Mean     |
|---------------|----------|------|----------|------|----------|
|               | (±0.069) |      | (±0.069) |      | (±0.049) |
| NC            | 6.01     | 5.85 | 5.67     | 6.18 | 5.93     |
| SU            | 5.99     | 6.04 | 5.78     | 6.26 | 6.02     |
| LU            | 6.01     | 5.98 | 5.74     | 6.24 | 5.99     |
|               |          |      | (±0.056) |      | (±0.040) |
|               |          | I    | 5.75     | 6.26 | 6.00     |
|               |          | B    | 5.72     | 6.20 | 5.96     |
| Mean (±0.040) |          |      | 5.73     | 6.23 | 5.98     |

NO 3.99 (±0.069)

General Mean: 5.70

Mean D.M. %: 84.8

71/R/B/3 and 71/W/B/3

GRAIN: TONNES/HECTARE

HORSEPOOL (W)

N: KG/HA

|               | I        | B    | 63       | 126  | Mean     |
|---------------|----------|------|----------|------|----------|
|               | (±0.118) |      | (±0.118) |      | (±0.083) |
| NC            | 5.83     | 5.64 | 5.95     | 5.53 | 5.74     |
| SU            | 5.86     | 5.86 | 6.21     | 5.51 | 5.86     |
| LU            | 5.68     | 5.75 | 5.88     | 5.55 | 5.71     |
|               |          |      | (±0.096) |      | (±0.068) |
|               |          | I    | 6.09     | 5.49 | 5.79     |
|               |          | B    | 5.93     | 5.57 | 5.75     |
| Mean (±0.068) |          |      | 6.01     | 5.53 | 5.77     |

NO 5.80 (±0.118)

General mean: 5.78

Mean D.M. %: 83.1

71/R/B/5

BARLEY

CONTROL OF CEREAL APHIDS AND BYDV

Object: To study the effects of controlling cereal aphids on the incidence of barley yellow dwarf virus - Great Knott III.

Design: 4 blocks of 2 x 2 x 2 randomisation restricted.

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

Treatments: Insecticides. All combinations of:-

1. Granules broadcast at sowing: None (O), 4.50 kg phorate (GE).
2. Spray in May: None (O), menazon ('Saphicol' at 0.70 l in 449 l) (SM).
3. Spray in June: None (O), menazon ('Saphicol' at 0.70 l in 449 l) (SL).

Basal applications: 437 kg (20:10:10) combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 225 l. Ioxynil octanoate, bromoxynil octanoate and the iso-octyl ester of dichlorprop ('Oxytril P' at 1.40 l in 225 l).

Cultivations, etc.: Paraquat applied: 14 Oct, 1970. Ploughed: 2 Nov. Phorate applied to GE plots, all plots rotary cultivated, seed combine drilled at 157 kg: 12 Mar, 1971. 'Oxytril P' applied: 11 May. Menazon applied: SM plots - 24 May, SL plots - 23 June. Combine harvested: 19 Aug. Variety: Julia. Previous crops: Potatoes 1969, winter wheat 1970.

NOTE: Virus infection was assessed and samples were taken for aphid incidence.

Standard error per plot.

Grain, tonnes/hectare: 0.154 or 2.6% (21 d.f.)

71/R/B/5

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|               | O        | SM   | O        | SL   | Mean     |
|---------------|----------|------|----------|------|----------|
|               | (±0.055) |      | (±0.055) |      | (±0.039) |
| O             | 5.75     | 5.93 | 5.84     | 5.84 | 5.84     |
| GE            | 6.12     | 6.23 | 6.19     | 6.16 | 6.18     |
|               |          |      | (±0.055) |      | (±0.039) |
|               |          | O    | 5.95     | 5.92 | 5.93     |
|               |          | SM   | 6.08     | 6.09 | 6.08     |
| Mean (±0.039) |          |      | 6.01     | 6.00 | 6.01     |
|               | O        |      | GE       |      |          |
|               | O        | SL   | O        | SL   |          |
|               | (±0.077) |      |          |      |          |
| O             | 5.72     | 5.77 | 6.18     | 6.07 |          |
| SM            | 5.95     | 5.92 | 6.20     | 6.25 |          |

Mean D.M. %: 85.5

71/R/B/6

BARLEY

WEEDKILLER AND AQUEOUS N

Object: To study the effects of a combined spray of liquid nitrogen fertiliser and a hormone weedkiller as a top dressing on barley - Great Knott III.

Design: 4 randomised blocks of 28 plots.

Whole plot dimensions: 2.13 x 2.74. Area harvested: 0.00038.

Treatments: All combinations of:-

1. Weedkiller (dichlorprop/MCPA): None (H0), 1.4 (H1), 2.8 (H2), 4.2 (H3) kg total a.e.
2. Forms of nitrogen: Solid, as 'Nitro-Chalk' 21% N applied immediately after the weedkiller (S), liquid, as urea/ammonium nitrate (26% N) mixed with the weedkiller (L).
3. Levels of nitrogen: 37.7, 75.3, 113.0 kg N.  
Together with 4 additional treatments  
SN2 E H0, SN2 E H1, SN2 E H2, SN2 E H3 (N2 = 75.3)  
where 'Nitro-Chalk' was applied early (E) and the H0 plots were hand weeded.

NOTE: The weedkiller was applied in 337 l where solid fertiliser was used. The liquid fertiliser (with or without weedkiller) was applied as a spray at 112, 225 and 337 l for rates 1, 2 and 3 respectively.

Basal applications: 224 kg (8:20:16) combine drilled. Weedkiller: Paraquat at 0.56 kg ion in 225 l.

Cultivations, etc.: Paraquat applied: 14 Oct, 1970. Ploughed: 2 - 10 Nov. Seed combine drilled at 157 kg: 1 Mar, 1971. N applied to E plots: 20 Apr. Remaining N treatments and weedkiller applied: 11 May. H0 plots hand weeded: 29 June. Cut by sickle: 10 Aug. Variety: Julia. Previous crops: Potatoes 1969, winter wheat 1970.

NOTE: Soil samples were taken in April for pH and the site examined for weed species. Scores were made of weedkiller scorch, growth and weed control and plots examined for ear deformities. Weeds were identified on the H0 plots. The percentage of N in grain was determined.

Standard error per plot.

Grain, tonnes/hectare: 0.373 or 6.9% (68 d.f.)

71/R/B/6

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|               | H0       | H1   | H2   | H3   | Mean     |
|---------------|----------|------|------|------|----------|
|               | (±0.108) |      |      |      | (±0.054) |
| S             | 5.50     | 5.42 | 5.39 | 5.58 | 5.47     |
| L             | 5.52     | 5.48 | 5.18 | 5.13 | 5.33     |
| N: KG/HA      | (±0.132) |      |      |      | (±0.066) |
| 37.7          | 5.05     | 5.03 | 4.73 | 4.78 | 4.90     |
| 75.3          | 5.71     | 5.51 | 5.46 | 5.50 | 5.54     |
| 113.0         | 5.77     | 5.82 | 5.67 | 5.78 | 5.76     |
| Mean (±0.076) | 5.51     | 5.45 | 5.28 | 5.36 | 5.40     |

N: KG/HA

|   | 37.7     | 75.3 | 113.0 |
|---|----------|------|-------|
|   | (±0.093) |      |       |
| S | 5.01     | 5.64 | 5.76  |
| L | 4.78     | 5.45 | 5.76  |

SN2 E H0 5.71  
 SN2 E H1 5.67 (±0.186)  
 SN2 E H2 5.62  
 SN2 E H3 5.44

General mean: 5.43

Mean D.M. %: 80.6

71/R/B/6

STRAW: TONNES/HECTARE

|          | H0   | H1   | H2   | H3   | Mean |
|----------|------|------|------|------|------|
| S        | 5.12 | 5.09 | 5.15 | 5.16 | 5.13 |
| L        | 5.36 | 5.12 | 4.79 | 4.78 | 5.01 |
| N: KG/HA |      |      |      |      |      |
| 37.7     | 4.68 | 4.58 | 4.30 | 4.35 | 4.48 |
| 75.3     | 5.28 | 5.10 | 5.13 | 5.11 | 5.16 |
| 113.0    | 5.75 | 5.63 | 5.49 | 5.45 | 5.58 |
| Mean     | 5.24 | 5.10 | 4.97 | 4.97 | 5.07 |

N: KG/HA

|   | 37.7 | 75.3 | 113.0 |
|---|------|------|-------|
| S | 4.54 | 5.25 | 5.60  |
| L | 4.41 | 5.06 | 5.56  |

SN2 E H0 5.88  
 SN2 E H1 5.73  
 SN2 E H2 5.61  
 SN2 E H3 5.50

General mean: 5.15

Mean D.M. %: 72.3

71/R/B/7

BARLEY

SEED RATES, ROW SPACING AND ETHIRIMOL

Object: To study the effects on yield and mildew incidence (*Erysiphe graminis*) of growing barley at small seed rates and close row spacing - Pastures.

Design: 4 randomised blocks of 12 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: R1 - 0.00260, R2 - 0.00279.

Treatments: All combinations of:-

1. Seed rate: 39 (S1), 78.5 (S2), 157 (S4) kg.
2. Row spacing: 10.2 cm (4 inches) between rows (R1), 20.3 cm (8 inches) between rows (R2).
3. Seed dressing: Organo-mercury (O), organo-mercury, plus ethirimol at 1.8 kg (F).

The two smaller seed rates were made up to 157 kg by the addition of seed which had been killed by heat in an oven.

Basal applications: 377 kg (20:10:10) broadcast. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 157 kg in 225 l.

Cultivations, etc.: Ploughed: 5 Nov, 1970. Basal NPK applied: 24 Feb, 1971. Seed drilled: 13 Mar. Weedkiller applied: 2 May. Combine harvested: 18 Aug. Variety: Zephyr. Previous crops: Barley 1969, spring beans 1970.

NOTE: Samples were taken for assessment of mildew (*Erysiphe graminis*) and brown rust (*Puccinia hordei*). Tiller counts were made and ear samples taken for estimation of number of grains per ear.

Standard error per plot.

Grain, tonnes/hectare: 0.344 or 7.4% (33 d.f.)

71/R/B/7

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|    | R1       |      | R2               | O        |      | F    | Mean     |
|----|----------|------|------------------|----------|------|------|----------|
|    | (±0.121) |      |                  | (±0.121) |      |      | (±0.086) |
| S1 | 3.88     |      | 3.90             | 3.69     |      | 4.08 | 3.89     |
| S2 | 4.92     |      | 4.73             | 4.37     |      | 5.28 | 4.83     |
| S4 | 5.27     |      | 5.31             | 4.87     |      | 5.70 | 5.29     |
|    |          |      |                  | (±0.099) |      |      | (±0.070) |
|    |          |      | R1               | 4.37     |      | 5.01 | 4.69     |
|    |          |      | R2               | 4.26     |      | 5.04 | 4.65     |
|    |          |      | Mean<br>(±0.070) | 4.31     |      | 5.02 | 4.67     |
|    | S1       |      | S2               |          | S4   |      |          |
|    | O        | F    | O                | F        | O    | F    |          |
|    | (±0.172) |      |                  |          |      |      |          |
| R1 | 3.74     | 4.02 | 4.51             | 5.34     | 4.87 |      | 5.66     |
| R2 | 3.65     | 4.14 | 4.24             | 5.23     | 4.87 |      | 5.75     |

Mean D.M. %: 85.6

71/R/B/8

BARLEY

TIMES OF APPLYING ETHIRIMOL

Object: To study the effects of ethirimol, applied at defined stages of mildew (*Erysiphe graminis*) epidemic and crop growth on subsequent mildew development and yield - Pastures.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 4.27 x 9.14. Area harvested: 0.00260.

Treatments: No systemic fungicide (O)  
Seed dressing ethirimol at 1.8 kg (D)  
Spray application of 0.90 kg ethirimol in 337 l  
at different times:  
When mildew developing on lowest leaf sheaths (S1)  
At start of flag leaf emergence (S2)  
At start of ear emergence (S3)

Basal applications: 377 kg (20:10:10) combine drilled. Weedkiller: Ioxynil at 0.53 kg plus mecoprop at 1.58 kg in 225 l.

Cultivations, etc.: Ploughed: 5 Nov, 1970. Seed combine drilled at 156 kg: 12 Mar, 1971. Weedkiller applied: 12 May. Ethirimol sprays applied: S1 - 12 May, S2 - 4 June, S3 - 15 June. Combine harvested: 18 Aug. Variety: Zephyr. Previous crops: Barley 1969, spring beans 1970.

NOTE: Samples were taken for assessment of mildew (*Erysiphe graminis*) and other foliar diseases.

Standard error per plot.

Grain, tonnes/hectare: 0.383 or 7.5% (12 d.f.)

71/R/B/8

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| Q    | D    | S1       | S2   | S3   | Mean |
|------|------|----------|------|------|------|
|      |      | (±0.192) |      |      |      |
| 4.69 | 5.61 | 5.21     | 4.90 | 5.23 | 5.13 |

Mean D.M. %: 85.2

71/R/B/9

BARLEY

ETHREL, DUST AND SPRAY

Object: To compare the effects of 'Ethrel', applied as dust or spray, on height and yield of barley - Pastures.

Design: 6 randomised blocks of 6 plots.

Whole plot dimensions: 2.16 x 6.71. Area harvested: 0.00087.

Treatments: 'Ethrel' (2-chloroethylphosphonic acid):-

None (0)

Dust: 3.4 kg a.i. at 2-leaf stage (D2), at 4-leaf stage (D4),  
at 6-leaf stage (D6)

Spray: 1.1 kg a.i. in 337 l at 6-leaf stage (S6), at 8-leaf  
stage (S8)

Basal applications: 370 kg (20:10:10). Weedkiller: 2,4-D at 0.56 kg  
plus dichlorprop at 2.24 kg in 337 l.

Cultivations, etc.: Ploughed: 5 Nov, 1970. Seed drilled at 188 kg,  
basal NPK applied: 29 Mar, 1971. D2 treatment applied: 27 Apr.  
Weedkiller applied: 11 May. Remaining dusts applied: D4 -  
19 May, D6 - 1 June. Sprays applied: S6 - 7 June, S8 - 16 June.  
Combine harvested: 25 Aug. Variety: Julia. Previous crops:  
Barley 1969, spring beans 1970.

NOTE: Shoot heights were measured and plant numbers counted.  
Samples were taken just before harvest for total dry matter  
and components of yield.

Standard error per plot.

Grain, tonnes/hectare: 0.327 or 6.5% (25 d.f.)

71/R/B/9

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| 0        | D2   | D4   | D6   | S6   | S8   | Mean |
|----------|------|------|------|------|------|------|
| (±0.134) |      |      |      |      |      |      |
| 5.44     | 5.33 | 5.33 | 4.95 | 4.32 | 4.91 | 5.05 |

Mean D.M. %: 83.7

71/R/B/10

BARLEY

SYSTEMIC FUNGICIDES

Object: To study the effects of a range of fungicides on yield and pathogens of barley - Drapers.

Design: 3 randomised blocks of 10 plots.

Whole plot dimensions: 4.27 x 13.4. Area harvested: 0.00190.

Treatments:

|                                             |       |
|---------------------------------------------|-------|
| No fungicidal treatment                     | (O)   |
| Seed dressings per kg of seed:              |       |
| 3191 F at 2 g                               | (BA)  |
| 3191 F plus confidential ingredient, at 3 g | (BAC) |
| 3200 F at 4 g                               | (BB)  |
| Organo-mercury at 2.2 g                     | (ME)  |
| MC 833 at 2.0 g                             | (MC)  |
| 'Vitavax' plus thiram, at 2.2 g             | (VT)  |
| NF 48 at 24 g                               | (NF)  |
| 'Vitavax' plus organo-mercury, at 2.2 g     | (V)   |
| Soil drench after sowing:                   |       |
| Sandoz Fungicide at 11.0 l a.i. in 5600 l   | (SF)  |

Basal applications: 505 kg (20:10:10) combine drilled. Weedkillers: Paraquat at 0.28 kg ion in 225 l.

Cultivations, etc.: Paraquat applied: 23 Sept, 1970. Ploughed: 3 Oct. Seed combine drilled at 157 kg: 26 Mar, 1971. Soil drench applied: 29 Mar. Combine harvested: 19 Aug. Variety: Sultan. Previous crops: Barley 1969 and 1970.

NOTE: Samples were taken for mildew (*Erysiphe graminis*), brown rust (*Puccinia hordei*), smut (*Ustilago nuda*) and root diseases.

Standard error per plot.

Grain, tonnes/hectare: 0.285 or 7.3% (18 d.f.)

71/R/B/10

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| O        | BA   | BAC  | BB   | ME   | MC   | VT   | NF   | V    | SF   | Mean |
|----------|------|------|------|------|------|------|------|------|------|------|
| (±0.165) |      |      |      |      |      |      |      |      |      |      |
| 3.69     | 3.66 | 3.09 | 4.38 | 3.95 | 4.01 | 3.63 | 4.83 | 4.11 | 3.72 | 3.91 |

Mean D.M.%: 82.0

71/R/B/11

BARLEY

METHODS OF APPLYING SYSTEMIC FUNGICIDES

Object: To study the effects on yield and pathogens of barley of different times and methods of applying systemic fungicides - Drapers.

Design: 3 randomised blocks of 11 plots.

Whole plot dimensions: 2.13 x 13.4. Area harvested: 0.00195.

Treatments:

|                                                   |      |
|---------------------------------------------------|------|
| No fungicidal treatment                           | (O)  |
| Seed dressings per kg of seed:-                   |      |
| Organo-mercury plus 'Vitavax', at 2.2 g           | (MD) |
| EL273 at 33.6 g a.i.                              | (ED) |
| Thiophanate methyl at 1.35 kg a.i.                | (TD) |
| W524 at 0.77 kg a.i.                              | (WD) |
| Foliar sprays, each applied early (E) or late (L) |      |
| EL273 at 44.5 ml a.i. in 337 l                    | (ES) |
| Thiophanate methyl at 1.68 kg a.i. in 337 l       | (TS) |
| W524 at 0.4 l a.i. in 674 l                       | (WS) |

Basal applications: 505 kg (20:10:10) combine drilled. Weedkillers:  
Paraquat at 0.28 kg ion in 225 l.

Cultivations, etc.: Paraquat applied: 23 Sept, 1970. Ploughed:  
25 Oct - 18 Dec. Seed combine drilled at 157 kg: 26 Mar, 1971.  
2,4-D/dichlorprop applied: 10 May. Sprays applied: E - 17 May,  
L - 15 June. Combine harvested: 19 Aug. Variety: Sultan.  
Previous crops: Barley 1969 and 1970.

NOTE: Samples were taken for mildew (*Erysiphe graminis*), brown rust (*Puccinia hordei*), smut (*Ustilago nuda*) and root diseases.

Standard error per plot.

Grain, tonnes/hectare: 0.210 or 5.0% (20 d.f.)

71/R/B/11

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

| O        | MD   | ED   | TD   | WD   | ESE  | ESL  | TSE  | TSL  | WSE  | WSL  | Mean |
|----------|------|------|------|------|------|------|------|------|------|------|------|
| (±0.121) |      |      |      |      |      |      |      |      |      |      |      |
| 3.90     | 3.87 | 4.04 | 4.26 | 4.39 | 4.60 | 4.15 | 4.41 | 4.28 | 4.73 | 3.93 | 4.23 |

Mean D.M. %: 82.1

71/R/B/12

BARLEY

EARLY AND LATE MILDEW

Object: To study the effects of mildew epidemics at various times -  
Long Hoos IV.

Design: 8 randomised blocks of 4 plots.

Dimensions of whole plot: 4.27 x 24.4. Area harvested: 0.00390.

Treatments: Fungicides, ethirimol:-

|                                                                                    |      |
|------------------------------------------------------------------------------------|------|
| None                                                                               | (0)  |
| 224 g as seed dressing                                                             | (1D) |
| 1.80 kg as seed dressing                                                           | (8D) |
| 0.90 kg in 337 l on 15 June (growth stage 10) and on<br>9 July (growth stage 11.1) | (8S) |

Basal applications: 377 kg (20:10:10) combine drilled. Weedkiller:  
Ioxynil octanoate, bromoxynil octanoate and the iso-octyl ester  
of dichlorprop ('Oxytril P' at 1.4 l in 225 l).

Cultivations, etc.: Deep-tine cultivated twice: 10 Oct, 1970.  
Seed combine drilled at 157 kg: 30 Mar, 1971. Weedkiller  
applied: 11 May. Combine harvested: 18 Aug. Variety: Zephyr.  
Previous crops: Spring beans 1969, potatoes 1970.

NOTE: Samples were taken for assessment of mildew (*Erysiphe graminis*) and  
other foliar diseases and for assessment of tiller numbers,  
tiller length and ear sizes.

Standard error per plot.

Grain, tonnes/hectare: 0.081 or 1.6% (21 d.f.)

71/R/B/12

SUMMARY OF RESULTS

| 0                     | 1D   | 8D   | 8S   | Mean |
|-----------------------|------|------|------|------|
| GRAIN: TONNES/HECTARE |      |      |      |      |
| (±0.029)              |      |      |      |      |
| 4.59                  | 4.97 | 5.48 | 4.70 | 4.94 |
| STRAW: TONNES/HECTARE |      |      |      |      |
| 3.78                  | 3.85 | 4.57 | 3.92 | 4.03 |

Mean D.M. %: Grain: 85.0  
Straw: 85.3

71/R/B/13

BARLEY

METHODS OF APPLYING NPK

Object: To study the effect of injecting NPK fertiliser between bands of seed, using the Tume Combi drill, on the yields of barley - West Barnfield I.

Design: 6 randomised blocks of 4 plots.

Dimensions of whole plot: 4.88 x 15.2. Area harvested: 0.00464.

Treatments: All combinations of:-

1. Drills and row spacing: Combine drill, 17.8 cm (7 inches) between rows (C), Tume Combi drill 25.4 cm (10 inches) between band centres (T).
2. Rates of compound fertiliser (25:10:10): 264, 505 kg.

Basal applications: No manures. Weedkillers: Paraquat at 0.28 kg ion in 225 l and later at 0.56 kg ion in 225 l, ioxynil octanoate, bromoxynil octanoate and the iso-octyl ester of dichlorprop ('Oxytril P' at 1.4 l in 225 l).

Cultivations, etc.: Paraquat applied: 19 Sept, 1970. Ploughed: 24 Sept. Paraquat applied: 5 Feb, 1971. Seed combine drilled at 157 kg: 26 Mar. 'Oxytril P' applied: 11 May. Combine harvested: 17 Aug. Variety: Julia. Previous crops: Spring oilseed rape 1969, winter wheat 1970.

Standard error per plot.

Grain, tonnes/hectare: 0.276 or 5.4% (15 d.f.)

71/R/B/13

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

(25:10:10): KG/HA

|               | 264      | 505  | Mean     |
|---------------|----------|------|----------|
|               | (±0.113) |      | (±0.080) |
| C             | 5.03     | 5.14 | 5.09     |
| T             | 4.99     | 5.17 | 5.08     |
| Mean (±0.080) | 5.01     | 5.16 | 5.09     |

Mean D.M. %: 85.0

71/s/B/1

BARLEY

VARIETIES, N RATES AND TIMES OF APPLICATION

Object: To study the effects of a range of nitrogen levels applied to the seedbed or in May, on the yield of two barley varieties. The effects of dressing seed with phenylphosphonic acid are also studied - Saxmundham Grove Plot.

Design: Two randomised blocks of 6 plots split into 4.

Whole plot dimensions: 2.74 x 12.2. Sub plot area harvested: 0.00052.

Treatments:-

Whole plots: All combinations of:-

1. Varieties: Midas (M), Sultan (S).
2. N levels: 50, 100, 150 kg N as calcium nitrate.

Sub plots: All combinations of:-

3. Times of applying N: To seedbed (E), top-dressed in May (L), (across whole plots).
4. Seed dressing: None (O), phenylphosphonic acid (0.2 % a.i.) sprayed over the seed as a seed dressing (D) (along whole plots).

Basal applications: 314 kg (0:20:20) broadcast. Weedkiller: Dichlorprop plus MCPA ('Mephetol Plus' at 5.61 l in 562 l). Fungicide: Tridemorph at 0.53 kg in 562 l.

Cultivations, etc.: Ploughed: 28 Oct, 1970. Seed drilled at 188 kg, seedbed N and basal PK applied: 31 Mar, 1971. Weedkiller applied: 18 May. Late N applied: 19 May. Fungicide applied: 17 June. Harvested by sickle: 11 Aug. Previous crops: Barley 1969, sugar beet 1970.

Standard errors per plot.

Grain, tonnes/hectare: Whole plot: 0.164 or 6.4% (5 d.f.)

Sub plot (T): 0.410 or 16.3% (6 d.f.)

(S): 0.231 or 9.2% (6 d.f.)

(TS): 0.289 or 11.5% (6 d.f.)

Pooled used for calculation of standard error in the summary:

0.320 or 12.7% (23 d.f.)

71/S/B/1

SUMMARY OF RESULTS

GRAIN: TONNES/HECTARE

|               | N: KG/HA |      |      | E        | L    | O        | D    | Mean     |
|---------------|----------|------|------|----------|------|----------|------|----------|
|               | 50       | 100  | 150  |          |      |          |      |          |
|               | (±0.113) |      |      | (±0.092) |      | (±0.092) |      | (±0.065) |
| M             | 2.47     | 2.50 | 2.37 | 2.62     | 2.28 | 2.32     | 2.58 | 2.45     |
| S             | 2.64     | 2.68 | 2.45 | 2.70     | 2.48 | 2.52     | 2.66 | 2.59     |
|               | N: KG/HA |      |      | (±0.113) |      | (±0.113) |      | (±0.080) |
|               |          |      | 50   | 2.65     | 2.45 | 2.44     | 2.66 | 2.55     |
|               |          |      | 100  | 2.79     | 2.39 | 2.44     | 2.74 | 2.59     |
|               |          |      | 150  | 2.53     | 2.29 | 2.37     | 2.46 | 2.41     |
|               |          |      |      |          |      | (±0.092) |      | (±0.065) |
|               |          |      |      |          | E    | 2.50     | 2.82 | 2.66     |
|               |          |      |      |          | L    | 2.33     | 2.43 | 2.38     |
| Mean (±0.047) |          |      |      |          |      | 2.42     | 2.62 | 2.52     |

Mean D.M. %: 76.4

71/S/B/1

STRAW: TONNES/HECTARE

|          | N: KG/HA |      |      | E    | L    | O    | D    | Mean |
|----------|----------|------|------|------|------|------|------|------|
|          | 50       | 100  | 150  |      |      |      |      |      |
| M        | 3.88     | 4.56 | 4.54 | 4.55 | 4.11 | 4.22 | 4.43 | 4.33 |
| S        | 3.52     | 3.92 | 4.23 | 3.96 | 3.82 | 3.69 | 4.09 | 3.89 |
| N: KG/HA |          |      |      |      |      |      |      |      |
|          |          | 50   |      | 3.85 | 3.55 | 3.70 | 3.71 | 3.70 |
|          |          | 100  |      | 4.55 | 3.93 | 4.09 | 4.39 | 4.24 |
|          |          | 150  |      | 4.36 | 4.41 | 4.09 | 4.69 | 4.39 |
|          |          |      |      |      | E    | 4.09 | 4.42 | 4.25 |
|          |          |      |      |      | L    | 3.83 | 4.10 | 3.96 |
| Mean     |          |      |      |      |      | 3.96 | 4.26 | 4.11 |

Mean D.M. %: 69.9

71/S/B/2

BARLEY

N RATES AFTER GRASS AND ARABLE

Object: To study the effects of a wide range of nitrogen levels on the yield of barley grown after grass (1967-69) or arable (1967-69) - Saxmundham Grove Plot.

Design: 4 randomised blocks (2 after grass and 2 after arable) of 8 plots.

Whole plot dimensions: 1.52 x 12.2. Area harvested: 0.00063.

Treatments:- Nitrogen: None, 25, 50, 75, 100, 125, 150, 175 kg N as 'Nitro-Chalk'.

Basal applications: Manures: 628 kg (0:20:20) broadcast. Weedkiller: Dichlorprop plus MCPA ('Mephetol Plus' at 5.6 l in 449 l).

Cultivations, etc.: Ploughed: 28 Oct, 1970. N and PK applied, seed drilled: 31 Mar, 1971. Weedkiller applied: 18 May. Harvested by sickle: 10 Aug. Variety: Midas. Previous crop: Barley 1970.

Standard error per plot. Grain, tonnes/hectare:  
Sub plot: 0.334 or 14.4% (14 d.f.)

71/S/B/2

SUMMARY OF RESULTS

N: KG/HA

|                       | 0    | 25   | 50   | 75   | 100  | 125  | 150  | 175  | Mean |
|-----------------------|------|------|------|------|------|------|------|------|------|
| GRAIN: TONNES/HECTARE |      |      |      |      |      |      |      |      |      |
| (±0.236)*             |      |      |      |      |      |      |      |      |      |
| AFTER                 |      |      |      |      |      |      |      |      |      |
| Grass                 | 1.30 | 2.44 | 2.50 | 1.72 | 2.08 | 2.71 | 2.61 | 2.07 | 2.18 |
| Arable                | 1.70 | 2.29 | 3.18 | 2.38 | 2.56 | 2.69 | 2.79 | 2.16 | 2.47 |
| Mean (±0.167)         | 1.50 | 2.37 | 2.84 | 2.05 | 2.32 | 2.70 | 2.70 | 2.12 | 2.32 |

STRAW: TONNES/HECTARE

|        |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|
| AFTER  |      |      |      |      |      |      |      |      |      |
| Grass  | 2.35 | 4.00 | 4.27 | 4.76 | 4.49 | 5.14 | 5.63 | 4.72 | 4.42 |
| Arable | 2.47 | 3.51 | 4.72 | 4.10 | 4.49 | 4.69 | 5.16 | 4.78 | 4.24 |
| Mean   | 2.41 | 3.75 | 4.50 | 4.43 | 4.49 | 4.92 | 5.39 | 4.75 | 4.33 |

Mean D.M. %: Grain: 75.1  
Straw: 68.1

\* For use in horizontal and interaction comparisons only