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## Yields of the Field Experiments 1980

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### 80/W/WW/3 Winter Wheat Growth and Yield on a Contrasted Site

#### Rothamsted Research

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80/W/WW/3

WINTER WHEAT

GROWTH AND YIELD ON A CONTRASTED SITE

Object: To study on a contrasted site the effects of some of the factors tested in 80/R/WW/3 Factors Limiting Yield and to determine the extent to which differences between the sites can be eliminated by appropriate combinations of the factors - Woburn Broad Mead I.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: Half replicate of  $2^6$  + 12 extra plots.

Whole plot dimensions: 3.25 x 15.24.

Treatments: Combinations of:-

1. SOWDATE                      Dates of sowing:  
    12 OCT                      12 October, 1979  
    30 OCT                      30 October
2. TOTAL N                      Total amounts of nitrogen fertiliser (kg N) applied:  
    90  
    150
3. N DIVIS                      Division of total nitrogen fertiliser:  
    SINGLE                      Single dressing  
    DIVIDED                     40 kg of the total before single dressing, 25 kg of the total after single dressing, remainder on single dressing date
4. N TIME                      Time of applying single dressing of nitrogen fertiliser  
    EARLY                      At ear initiation of SOWDATE 12 OCT  
    LATE                        At ear initiation of SOWDATE 30 OCT
5. AUT PEST                     Autumn pesticide:  
    NONE                        None  
    ALDICARB                   Aldicarb at 5 kg worked in to seedbed
6. IRRIGATN                     Irrigation:  
    NONE                        None  
    FULL                        Full (164 mm) to lessen a deficit of 25 mm to 12.5 mm

plus all combinations of the following (all given N as a single dressing at ear initiation of late sown crop, aldicarb to seedbed but not irrigation):

1. SOWDATEX                    Dates of sowing:  
    12 OCT  
    30 OCT

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2. TOTAL NX Total amount of nitrogen fertiliser (kg N):

0  
45  
90  
120  
150  
180

Irrigation was applied as follows (mm water):

|         |      |
|---------|------|
| 16 May  | 25   |
| 18 May  | 12.5 |
| 19 May  | 12.5 |
| 21 May  | 12.5 |
| 22 May  | 12.5 |
| 28 May  | 25   |
| 29 May  | 15   |
| 3 June  | 15   |
| 13 June | 16   |
| 23 June | 8    |
| 25 July | 10   |
| Total   | 164  |

NOTE: Nitrogen applications were as follows:

|                | N DIVIS |                       |
|----------------|---------|-----------------------|
|                | SINGLE  | DIVIDED               |
| SOWDATE 12 OCT | 5 Mar   | 31 Jan, 5 Mar, 8 May  |
| SOWDATE 30 OCT | 16 Apr  | 5 Mar, 16 Apr, 21 May |

Standard applications: Manures: (0:20:20) at 310 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 340 l to SE plots and in 280 l to SL plots). Isoproturon at 2.1 l in 280 l. Growth regulator: Chlormequat at 1.4 l in 280 l. Fungicides: Carbendazim, tridemorph and maneb ('Cosmic' at 4 kg in 250 l) applied three times, with captafol at 0.95 kg on the first occasion, with insecticide on the second and third occasion. Insecticide: Pirimicarb at 0.14 kg.

Seed: Hustler, sown at 160 kg.

Cultivations, etc.: - Heavy spring-tine cultivated twice: 6 Oct, 1979. PK applied, aldicarb applied for SOW DATE 12 OCT and all plots rotary cultivated: 8 Oct. Spring-tine cultivated all plots: 12 Oct. Aldicarb applied for SOW DATE 30 OCT. Spring-tine cultivated with crumbler attached these plots only: 29 Oct. 'Brittox' applied to SOW DATE 12 OCT: 20 Feb, 1980. Isoproturon applied to all plots: 11 Apr. 'Brittox' applied to SOW DATE 30 OCT, growth regulator applied to SOW DATE 12 OCT: 24 Apr. 'Cosmic' and captafol applied: 9 May. Growth regulator applied to SOW DATE 30 OCT: 13 May. 'Cosmic' and insecticide applied: 19 June, 10 July. Combine harvested: 26 Aug. Previous crops: W. oats 1978, potatoes 1979.

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NOTE: Measurements were made of plant and shoot numbers, dry weight of tops and ears, leaf areas and N, P and K content three times during growing season. Weekly measurements were made for soil moisture and plant moisture stress (between April and harvest). Disease assessments were made during the growing season. Soil samples were taken in autumn and spring before fertiliser application to determine their N content.

GRAIN TONNES/HECTARE

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

|         |        |         |      |
|---------|--------|---------|------|
| TOTAL N | 90     | 150     | MEAN |
| SOWDATE |        |         |      |
| 12 OCT  | 8.64   | 9.02    | 8.83 |
| 30 OCT  | 8.06   | 8.37    | 8.22 |
| MEAN    | 8.35   | 8.70    | 8.52 |
| N DIVIS | SINGLE | DIVIDED | MEAN |
| SOWDATE |        |         |      |
| 12 OCT  | 9.08   | 8.58    | 8.83 |
| 30 OCT  | 8.29   | 8.14    | 8.22 |
| MEAN    | 8.68   | 8.36    | 8.52 |
| N DIVIS | SINGLE | DIVIDED | MEAN |
| TOTAL N |        |         |      |
| 90      | 8.57   | 8.13    | 8.35 |
| 150     | 8.80   | 8.60    | 8.70 |
| MEAN    | 8.68   | 8.36    | 8.52 |
| N TIME  | EARLY  | LATE    | MEAN |
| SOWDATE |        |         |      |
| 12 OCT  | 8.57   | 9.09    | 8.83 |
| 30 OCT  | 8.12   | 8.31    | 8.22 |
| MEAN    | 8.35   | 8.70    | 8.52 |
| N TIME  | EARLY  | LATE    | MEAN |
| TOTAL N |        |         |      |
| 90      | 8.12   | 8.57    | 8.35 |
| 150     | 8.57   | 8.83    | 8.70 |
| MEAN    | 8.35   | 8.70    | 8.52 |
| N TIME  | EARLY  | LATE    | MEAN |
| N DIVIS |        |         |      |
| SINGLE  | 8.49   | 8.88    | 8.68 |
| DIVIDED | 8.21   | 8.52    | 8.36 |
| MEAN    | 8.35   | 8.70    | 8.52 |

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GRAIN TONNES/HECTARE

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

| AUT PEST | NONE | ALDICARB | MEAN |
|----------|------|----------|------|
| SOWDATE  |      |          |      |
| 12 OCT   | 8.76 | 8.90     | 8.83 |
| 30 OCT   | 8.31 | 8.12     | 8.22 |
| MEAN     | 8.54 | 8.51     | 8.52 |

| AUT PEST | NONE | ALDICARB | MEAN |
|----------|------|----------|------|
| TOTAL N  |      |          |      |
| 90       | 8.38 | 8.32     | 8.35 |
| 150      | 8.69 | 8.70     | 8.70 |
| MEAN     | 8.54 | 8.51     | 8.52 |

| AUT PEST | NONE | ALDICARB | MEAN |
|----------|------|----------|------|
| N DIVIS  |      |          |      |
| SINGLE   | 8.58 | 8.79     | 8.68 |
| DIVIDED  | 8.49 | 8.23     | 8.36 |
| MEAN     | 8.54 | 8.51     | 8.52 |

| AUT PEST | NONE | ALDICARB | MEAN |
|----------|------|----------|------|
| N TIME   |      |          |      |
| EARLY    | 8.27 | 8.42     | 8.35 |
| LATE     | 8.80 | 8.59     | 8.70 |
| MEAN     | 8.54 | 8.51     | 8.52 |

| IRRIGATN | NONE | FULL | MEAN |
|----------|------|------|------|
| SOWDATE  |      |      |      |
| 12 OCT   | 8.90 | 8.76 | 8.83 |
| 30 OCT   | 8.15 | 8.28 | 8.22 |
| MEAN     | 8.53 | 8.52 | 8.52 |

| IRRIGATN | NONE | FULL | MEAN |
|----------|------|------|------|
| TOTAL N  |      |      |      |
| 90       | 8.29 | 8.40 | 8.35 |
| 150      | 8.76 | 8.64 | 8.70 |
| MEAN     | 8.53 | 8.52 | 8.52 |

| IRRIGATN | NONE | FULL | MEAN |
|----------|------|------|------|
| N DIVIS  |      |      |      |
| SINGLE   | 8.76 | 8.61 | 8.68 |
| DIVIDED  | 8.30 | 8.43 | 8.36 |
| MEAN     | 8.53 | 8.52 | 8.52 |

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GRAIN TONNES/HECTARE

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

| IRRIGATN | NONE | FULL | MEAN |      |      |      |      |
|----------|------|------|------|------|------|------|------|
| N TIME   |      |      |      |      |      |      |      |
| EARLY    | 8.29 | 8.40 | 8.35 |      |      |      |      |
| LATE     | 8.76 | 8.64 | 8.70 |      |      |      |      |
| MEAN     | 8.53 | 8.52 | 8.52 |      |      |      |      |
| IRRIGATN | NONE | FULL | MEAN |      |      |      |      |
| AUT PEST |      |      |      |      |      |      |      |
| NONE     | 8.43 | 8.64 | 8.54 |      |      |      |      |
| ALDICARB | 8.62 | 8.40 | 8.51 |      |      |      |      |
| MEAN     | 8.53 | 8.52 | 8.52 |      |      |      |      |
| TOTAL NX | 0    | 45   | 90   | 120  | 150  | 180  | MEAN |
| SOWDATEX |      |      |      |      |      |      |      |
| 12 OCT   | 5.99 | 8.10 | 7.77 | 8.88 | 9.28 | 8.86 | 8.15 |
| 30 OCT   | 6.54 | 6.90 | 7.43 | 7.36 | 8.34 | 8.53 | 7.51 |
| MEAN     | 6.26 | 7.50 | 7.60 | 8.12 | 8.81 | 8.69 | 7.83 |

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

SED FOR ALL TABLES EXCEPT TOTAL NX. SOWDATEX  
 ONE FACTOR TABLES 0.102  
 TWO FACTOR TABLES 0.145

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

| STRATUM | DF | SE    | CV% |
|---------|----|-------|-----|
| WP      | 10 | 0.289 | 3.4 |

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00139