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## Yields of the Field Experiments 1989

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### 89/R/WW/3 N and Crop Physiology - W. Wheat

#### Rothamsted Research

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89/R/WW/3

**WINTER WHEAT**

**N AND CROP PHYSIOLOGY**

**Object:** To study, in crops given optimal or less than optimal N, the dynamics of late N within the plant, the effects on flag leaf photosynthesis and protein retention and the N status of individual organs - Little Knott I.

**Sponsors:** G.F.J. Milford, D.W. Lawlor, P.B. Barraclough.

**Associate sponsor:** D.S. Powlson.

**Design:** 3 randomised blocks of 9 plots.

**Whole plot dimensions:** 3.0 x 9.0.

**Treatments:** All combinations of:-

1. **EARLY N** Nitrogen fertilizer (kg N) applied as 'Nitro-Chalk' divided in a 1:2:1 ratio between 30 Mar, 1989, 14 Apr and 5 May respectively:

0  
80  
200

2. **LATE N** Nitrogen fertilizer applied late:

0 None  
NLEAF To foliage, 40 kg N as urea in 225 l in two equal applications on 25 May, 1989 and 26 May  
NSOIL To soil, 40 kg N as prilled urea on 25 May

plus two extra treatments given EARLY N 200 and magnesium at 2.5 kg on 23 June and on 7 July:

**EARLYNMG**

NONE None  
UREA 40 kg N as urea in 225 l in two equal applications on 23 June, 1989, and 24 June

**Basal applications:** Manures: (0:18:36) at 280 kg. Weedkillers: Glyphosate at 0.27 kg in 200 l. Paraquat at 0.60 kg ion in 200 l. Metsulfuron-methyl at 6.0 g with the prochloraz in 220 l. Fungicides: Prochloraz at 0.40 kg. Propiconazole at 0.12 kg with chlorothalonil at 1.0 kg in 220 l. Insecticide: Fonofos at 1.4 kg in 200 l.

**Seed:** Avalon, sown at 170 kg.

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**Cultivations, etc.:-** Rotary cultivated: 17 Sept, 1988. Glyphosate applied: 17 Oct. Paraquat applied: 24 Oct. Heavy spring-tine cultivated: 26 Oct. PK applied: 28 Oct. Ploughed: 29 Oct. Rotary harrowed: 1 Nov. Rotary harrowed, seed sown: 3 Nov. Fonofos applied: 26 Jan, 1989. Metsulfuron-methyl with prochloraz applied: 3 May. Propiconazole with chlorothalonil applied: 15 June. Combine harvested: 3 Aug. Previous crops: S. beans 1987, w. oats 1988.

**NOTE:** Samples were taken for measurements of crop and grain growth and N content, weekly from April until maturity.

**GRAIN TONNES/HECTARE**

\*\*\*\*\* Tables of means \*\*\*\*\*

| LATE N     | 0    | NLEAF | NSOIL | Mean |
|------------|------|-------|-------|------|
| EARLY N    |      |       |       |      |
| 0          | 3.19 | 3.55  | 3.95  | 3.56 |
| 80         | 5.95 | 5.69  | 5.61  | 5.75 |
| 200        | 6.94 | 6.73  | 6.49  | 6.72 |
| Mean       | 5.36 | 5.32  | 5.35  | 5.34 |
| EARLYNMG   | NONE | UREA  | Mean  |      |
|            | 6.68 | 6.63  | 6.66  |      |
| GRAND MEAN | 5.58 |       |       |      |

\*\*\* Standard errors of differences of means \*\*\*

| EARLY N | LATE N | EARLY N<br>LATE N<br>& EARLYNMG |
|---------|--------|---------------------------------|
| 0.287   | 0.287  | 0.497                           |

\*\*\*\*\* Stratum standard errors and coefficients of variation \*\*\*\*\*

| Stratum             | d.f.    | s.e.  | cv%  |
|---------------------|---------|-------|------|
| BLOCK.WP            | 20      | 0.608 | 10.9 |
| GRAIN MEAN DM%      | 85.0    |       |      |
| PLOT AREA HARVESTED | 0.00207 |       |      |