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## Yields of the Field Experiments 1972

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### 72/R/WW/12 Winter Wheat Effects of Blue Green Algae

#### Rothamsted Research

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72/R/WW/12

WINTER WHEAT

EFFECTS OF BLUE-GREEN ALGAE

Object: To study the establishment of blue-green algae in relation to culture type, method of application, irrigation and nitrogen fertiliser. Effects on yield of wheat are also tested - Great Field II.

Sponsor: P.J. Dart.

Design: A single replicate of 5 x 3 x 2 x 2 in 60 plots.

Whole plot dimensions: 2.13 x 4.57. Area harvested: 0.00081.

Treatments: All combinations of:-

1. Type of algal culture\* (C):

- |                                                       |     |
|-------------------------------------------------------|-----|
| None                                                  | (0) |
| Nostoc ellipsosporium (isolated from Broadbalk Field) | (1) |
| Nostoc punctiformum (isolated from Broadbalk Field)   | (2) |
| Anabaena cylindrica                                   | (3) |
| A mixture of the three species                        | (4) |

2. Irrigation (I): None (0), 50 mm (2 inches) during the first week in July (1), soil surface kept continually moist (2).

3. Method of application of algal inoculum\* (M): In water as a spray (1), as a dry sand crust broadcast by hand (2).

4. N levels: 0, 50 kg as 'Nitro-Chalk'.

\* Rates of application of inoculum were as follows:

(in g/ha of dry weight of algae)

|                 |     |     |
|-----------------|-----|-----|
| Spray inoculum: | C1: | 920 |
|                 | C2: | 920 |
|                 | C3: | 420 |
|                 | C4: | 670 |

|                     |     |     |
|---------------------|-----|-----|
| Dry sand inoculum:  | C1: | 450 |
| (estimated weights) | C2: | 830 |
|                     | C3: | 260 |
|                     | C4: | 830 |

Basal applications: 280 kg (0:20:20) combine drilled.

Seed: Maris Ranger sown at 200 kg.

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Cultivations, etc.: Ploughed: 23 Sept, 1971. Seed combine drilled:  
6 Oct. N and water cultures applied: 9 May, 1972. Sand cultures  
applied: 15 May. Combine harvested: 31 Aug. Previous crops:  
Barley 1970 beans 1971.

NOTE: Estimates were made of the extent of algal cover and species  
involved and of recovery of inoculum types. N fixation was  
measured by acetylene reduction assay.

Standard error per plot (estimated from 4 factor interaction).  
Grain, tonnes/hectare: 0.543 or 8.2% (8 d.f.)

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TABLES OF MEANS

GRAIN: TONNES/HECTARE

|      | I    |      |      | M    |      | N: KG/HA |      | Mean |
|------|------|------|------|------|------|----------|------|------|
|      | 0    | 1    | 2    | 1    | 2    | 0        | 50   |      |
| C    |      |      |      |      |      |          |      |      |
| 0    | 6.23 | 6.60 | 6.92 | 6.70 | 6.47 | 5.70     | 7.47 | 6.58 |
| 1    | 7.07 | 6.48 | 6.76 | 6.75 | 6.78 | 6.00     | 7.54 | 6.77 |
| 2    | 6.47 | 6.37 | 6.44 | 6.67 | 6.18 | 5.38     | 7.47 | 6.42 |
| 3    | 6.74 | 6.59 | 6.73 | 6.72 | 6.65 | 5.64     | 7.74 | 6.69 |
| 4    | 6.77 | 6.46 | 6.45 | 6.61 | 6.52 | 5.76     | 7.36 | 6.56 |
|      | I    |      |      |      |      |          |      |      |
|      |      | 0    |      | 6.77 | 6.54 | 5.80     | 7.51 | 6.66 |
|      |      | 1    |      | 6.60 | 6.40 | 5.54     | 7.46 | 6.50 |
|      |      | 2    |      | 6.69 | 6.63 | 5.75     | 7.57 | 6.66 |
|      |      |      |      | M    |      |          |      |      |
|      |      |      |      | 1    |      | 5.79     | 7.59 | 6.69 |
|      |      |      |      | 2    |      | 5.60     | 7.44 | 6.52 |
| Mean |      |      |      |      |      | 5.70     | 7.51 | 6.61 |

STANDARD ERRORS OF DIFFERENCES

| C     | I     | M     | N     | C     | C     | I     | C     | I     | M     |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       |       |       |       | I     | M     | M     | N     | N     | N     |
| 0.222 | 0.172 | 0.140 | 0.140 | 0.384 | 0.314 | 0.243 | 0.314 | 0.243 | 0.198 |

Mean D.M. %: 85.8