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## Yields of the Field Experiments 1998

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### 98/R/HB/2 Hoos Barley - S. Barley

#### Rothamsted Research

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98/R/HB/2

HOOS BARLEY

**Object:** To study the effects of organic and inorganic manures on continuous s. barley. From 1968 to 1978 a rotation of potatoes, beans and s. barley was practised. The rotation was discontinued in 1979 and continued in s. barley.

The 147th year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-97/R/HB/2.

**Treatments:** All combinations of:-

Whole plots

1. **MANURE** Plot Fertilizers and organic manures:

|       |     | Form of N<br>1852-1966 | Additional<br>treatments<br>1852-1979 | Changes<br>since<br>1980 |
|-------|-----|------------------------|---------------------------------------|--------------------------|
| ---   | 11  | None                   | -                                     | -                        |
| -P-   | 21  | None                   | P                                     | -                        |
| --K   | 31  | None                   | K(Na)Mg                               | -                        |
| -PK   | 41  | None                   | PK(Na)Mg                              | -                        |
| A--   | 12  | A                      | -                                     | -                        |
| AP-   | 22  | A                      | P                                     | -                        |
| A-K   | 32  | A                      | K(Na)Mg                               | -                        |
| APK   | 42  | A                      | PK(Na)Mg                              | -                        |
| N---- | 131 | N                      | -                                     | -                        |
| NP--- | 231 | N                      | P                                     | -                        |
| N-K-- | 331 | N                      | K(Na)Mg                               | -                        |
| NPK-- | 431 | N                      | PK(Na)Mg                              | -                        |
| N--S- | 134 | N                      | Si                                    | Si omitted               |
| NP-S- | 234 | N                      | P Si                                  | "                        |
| N-KS- | 334 | N                      | K(Na)MgSi                             | "                        |
| NPKS- | 434 | N                      | PK(Na)MgSi                            | "                        |
| N---S | 132 | N                      | -                                     | Si added                 |
| NP--S | 232 | N                      | P                                     | "                        |
| N-K-S | 332 | N                      | K(Na)Mg                               | "                        |
| NPK-S | 432 | N                      | PK(Na)Mg                              | "                        |
| N--SS | 133 | N                      | Si                                    | -                        |
| NP-SS | 233 | N                      | P Si                                  | -                        |
| N-KSS | 333 | N                      | K(Na)MgSi                             | -                        |
| NPKSS | 433 | N                      | PK(Na)MgSi                            | -                        |
| C(--) | 14  | C                      | -                                     | PKMg omitted             |
| C(P-) | 24  | C                      | P                                     | "                        |
| C(-K) | 34  | C                      | K(Na)Mg                               | "                        |
| C(PK) | 44  | C                      | PK(Na)Mg                              | "                        |
| D     | 72  | None                   | D                                     | -                        |
| (D)   | 71  | None                   | (D)                                   | -                        |
| (A)   | 62  | None                   | (Ashes)                               | -                        |
| -     | 61  | None                   | -                                     | -                        |

98/R/HB/2

Form of N: A sulphate of ammonia: N nitrate of soda - each to supply  
48 kg N: C castor meal to supply 97 kg N  
P: 35 kg P as triple superphosphate in 1974 and since 1988,  
single superphosphate in other years  
K: 90 kg K as sulphate of potash  
(Na): 16 kg Na as sulphate of soda until 1973  
Mg: 35 kg Mg as kieserite every third year since 1974 (sulphate  
of magnesia annually until 1973)  
Si: Silicate of soda at 450 kg  
D: Farmyard manure at 35 t. (D): until 1871 only  
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

Sub-plots

2. **N** Nitrogen fertilizer (kg N), as 'Nitro-Chalk', since  
1968 (cumulative N applications until 1973, on a  
cyclic system since 1974):

0  
48  
96  
144

Plus extra plots testing all combinations of:-

Whole plots

1 **MANURE** Fertilizers other than magnesium:  
55AN2PK Plot 55 AN2PK  
56--PK Plot 56 --PK  
57NN2-- Plot 57 NN2  
58NN2-- Plot 58 NN2

N2: 96 kg N as 'Nitro-Chalk' since 1968. Other symbols as above.

Sub-plots

2. **MAGNESIUM** Magnesium fertilizer (kg Mg) as kieserite every third  
year since 1974:

0  
35

**NOTE:** For a fuller record see 'Details' etc.

98/R/HB/2

**Experimental diary:**

21-Aug-97 : B : Straw baled.  
13-Nov-97 : B : Alpha Glyphogan at 1.5 l with Vassgro Non Ionic at 250 ml  
in 200 l.  
26-Nov-97 : T : Si applied.  
03-Dec-97 : T : P applied.  
06-Jan-98 : T : K and Mg applied.  
13-Jan-98 : T : Farmyard manure applied.  
14-Jan-98 : B : Ploughed.  
04-Feb-98 : B : Spring-tine cultivated.  
05-Feb-98 : B : Rotary harrowed, Cooper, dressed Baytan Flowable,  
drilled at 350 seeds per m<sup>2</sup>.  
23-Mar-98 : T : N applied.  
08-May-98 : B : Ally at 20 g with MSS Optica at 2.0 l in 200 l.  
Bavistin DF at 0.5 kg with Opus at 0.3 l in 200 l.  
07-Jul-98 : B : Hand rogued wild oats.  
10-Aug-98 : B : Combine harvested.

**NOTE:** Samples of grain and straw were taken for chemical analysis. Unground grain and straw samples were archived.

98/R/HB/2 MAIN PLOTS

GRAIN TONNES/HECTARE

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

| N             | 0    | 48   | 96   | 144  | Mean |
|---------------|------|------|------|------|------|
| <b>MANURE</b> |      |      |      |      |      |
| ---           | 0.43 | 0.54 | 0.39 | 1.30 | 0.67 |
| -P-           | 2.53 | 3.21 | 2.72 | 2.75 | 2.80 |
| --K           | 0.55 | 1.68 | 1.93 | 2.99 | 1.79 |
| -PK           | 1.63 | 3.16 | 4.34 | 5.04 | 3.54 |
| A--           | 1.03 | 1.51 | 1.16 | 1.09 | 1.20 |
| AP-           | 2.49 | 2.75 | 2.48 | 2.05 | 2.44 |
| A-K           | 0.92 | 1.86 | 2.09 | 2.21 | 1.77 |
| APK           | 1.83 | 3.40 | 4.93 | 5.55 | 3.93 |
| N----         | 1.49 | 1.55 | 1.50 | 2.80 | 1.83 |
| NP---         | 2.84 | 3.45 | 3.28 | 3.75 | 3.33 |
| N-K--         | 1.36 | 2.65 | 2.90 | 2.38 | 2.32 |
| NPK--         | 2.04 | 3.67 | 5.45 | 6.00 | 4.29 |
| N--S-         | 1.52 | 2.05 | 3.99 | 3.50 | 2.77 |
| NP-S-         | 2.41 | 4.15 | 3.30 | 4.25 | 3.53 |
| N-KS-         | 2.03 | 2.98 | 3.58 | 4.49 | 3.27 |
| NPKS-         | 2.46 | 4.36 | 5.41 | 6.18 | 4.60 |
| N---S         | 1.92 | 3.02 | 2.74 | 2.96 | 2.66 |
| NP--S         | 2.71 | 3.85 | 4.69 | 4.35 | 3.90 |
| N-K-S         | 2.05 | 2.48 | 3.78 | 3.91 | 3.05 |
| NPK-S         | 2.09 | 3.72 | 5.03 | 5.74 | 4.15 |
| N--SS         | 2.12 | 2.12 | 2.44 | 4.26 | 2.74 |
| NP-SS         | 2.35 | 3.90 | 4.01 | 4.16 | 3.61 |
| N-KSS         | 1.93 | 3.42 | 4.01 | 4.83 | 3.55 |
| NPKSS         | 2.29 | 3.90 | 5.33 | 6.12 | 4.41 |
| C(--)         | 1.71 | 2.66 | 2.84 | 3.41 | 2.65 |
| C(P-)         | 2.21 | 4.29 | 4.34 | 4.50 | 3.84 |
| C(-K)         | 1.84 | 2.49 | 3.93 | 4.26 | 3.13 |
| C(PK)         | 1.99 | 3.82 | 4.77 | 5.81 | 4.10 |
| D             | 6.51 | 6.99 | 6.82 | 6.16 | 6.62 |
| (D)           | 1.19 | 2.20 | 5.19 | 3.29 | 2.97 |
| (A)           | 1.38 | 3.07 | 2.58 | 2.94 | 2.49 |
| -             | 1.00 | 1.75 | 1.79 | 2.41 | 1.74 |
| Mean          | 1.96 | 3.02 | 3.55 | 3.92 | 3.11 |

GRAIN MEAN DM% 85.6

98/R/HB/2 MAIN PLOTS

STRAW TONNES/HECTARE

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

| N             | 0    | 48   | 96   | 144  | Mean |
|---------------|------|------|------|------|------|
| <b>MANURE</b> |      |      |      |      |      |
| ---           | 0.08 | 0.27 | 0.45 | 0.62 | 0.35 |
| -P-           | 0.81 | 1.58 | 1.35 | 1.58 | 1.33 |
| --K           | 0.22 | 0.57 | 1.00 | 1.59 | 0.84 |
| -PK           | 0.61 | 1.19 | 1.98 | 2.02 | 1.45 |
| A--           | 0.35 | 0.51 | 0.31 | 0.47 | 0.41 |
| AP-           | 1.05 | 1.50 | 1.84 | 1.37 | 1.44 |
| A-K           | 0.23 | 0.77 | 1.49 | 1.08 | 0.89 |
| APK           | 0.61 | 1.56 | 2.51 | 2.30 | 1.75 |
| N----         | 1.15 | 1.90 | 1.73 | 2.26 | 1.76 |
| NP---         | 1.58 | 2.32 | 2.38 | 2.78 | 2.27 |
| N-K--         | 1.14 | 1.89 | 2.33 | 2.06 | 1.86 |
| NPK--         | 1.26 | 2.01 | 3.06 | 3.28 | 2.41 |
| N--S-         | 1.23 | 2.08 | 2.77 | 2.48 | 2.14 |
| NP-S-         | 1.72 | 2.79 | 2.33 | 2.58 | 2.35 |
| N-KS-         | 1.66 | 2.02 | 2.56 | 2.64 | 2.22 |
| NPKS-         | 1.74 | 2.56 | 3.13 | 3.41 | 2.71 |
| N---S         | 1.91 | 2.04 | 2.57 | 2.33 | 2.21 |
| NP--S         | 2.24 | 2.13 | 2.80 | 3.27 | 2.61 |
| N-K-S         | 1.44 | 1.88 | 3.16 | 3.53 | 2.50 |
| NPK-S         | 1.64 | 3.17 | 2.90 | 2.89 | 2.65 |
| N--SS         | 1.40 | 1.85 | 1.89 | 2.91 | 2.01 |
| NP-SS         | 1.83 | 2.83 | 2.51 | 3.01 | 2.54 |
| N-KSS         | 1.83 | 2.25 | 3.64 | 2.98 | 2.67 |
| NPKSS         | 1.68 | 2.66 | 3.65 | 3.72 | 2.93 |
| D             | 2.95 | 4.85 | 5.15 | 4.55 | 4.37 |
| (D)           | 0.76 | 1.36 | 2.50 | 2.12 | 1.69 |
| (A)           | 0.36 | 1.59 | 1.30 | 1.56 | 1.20 |
| -             | 0.35 | 0.72 | 1.11 | 1.47 | 0.91 |
| Mean          | 1.21 | 1.89 | 2.30 | 2.39 | 1.95 |

STRAW MEAN DM% 90.0

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

| MANURE           | 551AN2PK | 561--PK | 571NN2-- | 581NN2-- | Mean |
|------------------|----------|---------|----------|----------|------|
| <b>MAGNESIUM</b> |          |         |          |          |      |
| 0                | 4.52     | 0.62    | 2.76     | 1.56     | 2.36 |
| 35               | 4.28     | 0.68    | 2.41     | 1.61     | 2.24 |
| Mean             | 4.40     | 0.65    | 2.58     | 1.58     | 2.30 |

GRAIN MEAN DM% 86.9