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Yields of the Field Experiments 2001

[Full Table of Content](#)

Yields of the
Classical
and other
Long-term Experiments
2001

MACR - Rothamsted

01/R/HB/2 - Hoos Barley

Rothamsted Research

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01/R/HB/2

HOOS BARLEY

Object: To study the effects of organic manures and inorganic fertilisers 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 150 year, s. barley.

For previous years see 'Details' 1967 and 1973, Station Report for 1966 and 74-00/HB/2.

Treatments: All combinations of:-

Whole plots

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

		Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980	Additional treatments since 2001
---	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	"	
D1852	72	None	D	-	
(D)	71	None	(D)	-	
(A)	62	None	(Ashes)	-	
-	61	None	-	-	
D2001	73	-	-	-	D
P2KMg	63	-	-	-	P2KMg

Form of N: A sulphate of ammonia: N nitrate of soda - each to supply 48 kg N: C castor meal to supply 96 kg N
 P: 35 kg P as triple superphosphate in 1974 and since 1988, single superphosphate in other years
 P2: 44 kg P as triple superphosphate started in 2001.
 K: 90 kg K as sulphate of potash

01/R/HB/2

(Na): 16 kg Na as sulphate of soda until 1973
Mg: 35 kg Mg as kieserite every third year since 1974 (applied at 30 kg in 1992, 1995 and 1998) (sulphate of magnesia annually until 1973). Annually to new plot 63.
Si: Silicate of soda at 450 kg
D1852: Farmyard manure at 35 t since 1852.
D2001: Farmyard manure at 35 t since 2001
(D): until 1852 - 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 (30 in 1992, 1995 and 1998)

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

Experimental diary:

02-Jan-01 : **T** : P, P2, K and Mg applied. K and Mg completed 05-Jan-01.
03-Jan-01 : **T** : FYM and Si applied.
08-Jan-01 : **B** : ploughed.
30-Mar-01 : **B** : Combination drilled, Optic, tr. Raxil S, at 350 seeds/m² with the Accord drill.
19-May-01 : **B** : tm)Ally at 20 g in 100 l.
 : **B** : tm)Starane 2 at 0.5 l in 100 l.
21-May-01 : **T** : N applied (27.5% N) applied by hand.
11-Jun-01 : **B** : Opus at 0.4 l in 100 l.
02-Jul-01 : **B** : Folicur at 0.5 l in 200 l.
06-Sep-01 : **T** : Combine harvested, plots for yield, sampled and weighed straw, swathed straw, started.
07-Sep-01 : **T** : Combine harvested remaining plots for yield, and discards. Sampled and weighed straw. Swathed straw.
11-Sep-01 : **B** : Baled straw.

Note: Samples of grain and straw were taken for chemical analysis. Unground grain and straw samples from selected treatments were archived.

00/R/HB/2 MAIN PLOTS

GRAIN TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.64	0.63	0.67	0.82	0.69
-P-	1.23	2.18	2.26	2.10	1.94
--K	0.72	0.94	0.99	1.32	1.00
-PK	0.94	1.90	2.49	2.22	1.89
A--	0.58	0.57	0.47	0.22	0.46
AP-	1.37	1.53	1.70	1.92	1.63
A-K	0.71	1.01	1.23	1.10	1.01
APK	1.18	1.81	2.33	2.86	2.04
N----	0.90	0.84	1.31	1.01	1.01
NP---	1.55	2.09	2.91	2.75	2.32
N-K--	0.65	1.26	1.50	1.42	1.21
NPK--	1.25	1.92	2.60	2.49	2.06
N--S-	1.20	1.37	1.78	2.37	1.68
NP-S-	1.38	2.40	2.92	2.32	2.26
N-KS-	1.02	1.75	1.79	2.15	1.68
NPKS-	1.57	2.41	2.93	3.21	2.53
N---S	1.26	1.49	1.56	1.79	1.52
NP--S	1.44	2.34	2.69	3.10	2.39
N-K-S	1.07	1.36	1.72	2.14	1.57
NPK-S	1.18	2.21	2.78	3.18	2.34
N--SS	1.02	1.62	1.74	1.62	1.50
NP-SS	1.80	2.16	2.58	2.69	2.30
N-KSS	1.49	1.91	2.05	2.27	1.93
NPKSS	1.27	2.04	2.75	2.65	2.18
C(--)	1.18	1.83	1.92	1.79	1.68
C(P-)	1.23	2.21	2.70	2.64	2.20
C(-K)	0.65	1.83	1.83	2.25	1.64
C(PK)	0.99	2.05	2.38	2.96	2.10
D1852	3.71	4.25	5.08	4.69	4.43
(D)	0.84	0.82	1.18	2.88	1.43
(A)	0.85	1.19	1.36	1.35	1.19
-	0.97	0.87	1.01	0.99	0.96
D2001	2.30	2.64	3.28	3.22	2.86
P2K	1.64	2.81	2.39	2.62	2.36
Mean	1.23	1.77	2.08	2.21	1.82

GRAIN MEAN DM% 71.4

00/R/HB/2 MAIN PLOTS

STRAW TONNES/HECTARE

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

N	0	48	96	144	Mean
MANURE					
---	0.14	0.25	0.16	0.37	0.23
-P-	0.25	0.31	0.31	0.36	0.31
--K	0.12	0.32	0.33	0.27	0.26
-PK	0.27	0.50	0.51	0.76	0.51
A--	0.19	0.15	0.13	0.08	0.14
AP-	0.32	0.36	0.43	0.59	0.42
A-K	0.09	0.24	0.23	0.42	0.25
APK	0.26	0.38	0.50	0.66	0.45
N----	0.21	0.24	0.51	0.28	0.31
NP---	0.38	0.56	0.79	0.66	0.60
N-K--	0.17	0.24	0.46	0.47	0.33
NPK--	0.37	0.45	0.67	0.67	0.54
N--S-	0.28	0.30	0.72	0.49	0.45
NP-S-	0.22	0.50	0.54	0.36	0.40
N-KS-	0.18	0.30	0.34	0.47	0.32
NPKS-	0.19	0.43	0.57	0.68	0.47
N---S	0.31	0.39	0.45	0.59	0.43
NP--S	0.25	0.62	0.60	0.70	0.54
N-K-S	0.22	0.46	0.42	0.76	0.47
NPK-S	0.27	0.41	0.60	1.20	0.62
N--SS	0.18	0.30	0.31	0.37	0.29
NP-SS	0.43	0.31	0.67	0.46	0.47
N-KSS	0.24	0.37	0.36	0.47	0.36
NPKSS	0.18	0.30	0.56	0.53	0.39
D1852	1.15	1.26	1.53	1.24	1.30
(D)	0.19	0.18	0.20	0.47	0.26
(A)	0.25	0.35	0.35	0.38	0.33
-	0.33	0.19	0.26	0.49	0.32
D2001	0.68	0.78	1.01	0.87	0.83
P2K	0.33	0.74	0.50	0.64	0.55
Mean	0.29	0.41	0.50	0.56	0.44

STRAW MEAN DM% 80.2

EXTRA PLOTS

GRAIN TONNES/HECTARE

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

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	Mean
MGNESIUM					
0	2.42	0.43	1.53	1.20	1.39
35	2.51	0.48	1.74	1.33	1.51
Mean	2.46	0.45	1.64	1.26	1.45

GRAIN MEAN DM% 78.4