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# Yields of the Field Experiments 1976

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## 76/R/HB/2 Hoosfield - Barley, Potatoes , Beans

### Rothamsted Research

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76/R/HB/2

HOOSFIELD

Object: To study the effects of organic and inorganic manures on continuous spring barley. Since 1968 a rotation of potatoes, beans and barley has been included.

The 125th year, barley, potatoes and beans. The 9th year of revised scheme.

For previous years see 'Details' 1967, Station Report for 1966, 68/A/2(t), 69/R/HB/2(t) and 70-75/R/HB/2.

Treatments to barley: All combinations of:-

1. MANURE Fertilisers, organic manures and frequency of barley cropping:-

	Form of N 1852-1966	Additional treatments 1852-1976	
--CON	None	-	Continuous
-P-CON	None	P	Continuous
--KCON	None	K (Na) Mg	Continuous
-PKCON	None	P K (Na) Mg	Continuous
A--CON	A	-	Continuous
AP-CON	A	P	Continuous
A-KCON	A	K (Na) Mg	Continuous
APKCON	A	P K (Na) Mg	Continuous
N--CON	N	-	Continuous
N--SICON	N	- Si	Continuous
N--RTN	N	-	In rotation (P, BE, B)
N--SIRTN	N	- Si	In rotation (P, BE, B)
NP-CON	N	P	Continuous
NP-SICON	N	P Si	Continuous
NP-RTN	N	P	In rotation (P, BE, B)
NP-SIRTN	N	P Si	In rotation (P, BE, B)
N-KCON	N	K (Na) Mg	Continuous
N-KSICON	N	K (Na) Mg Si	Continuous
N-KRTN	N	K (Na) Mg	In rotation (P, BE, B)
N-KSIRTN	N	K (Na) Mg Si	In rotation (P, BE, B)
NPKCON	N	P K (Na) Mg	Continuous
NPKSICON	N	P K (Na) Mg Si	Continuous
NPKRTN	N	P K (Na) Mg	In rotation (P, BE, B)
NPKSIRTN	N	P K (Na) Mg Si	In rotation (P, BE, B)
C--CON	C	-	Continuous
C--RTN	C	-	In rotation (P, BE, B)
CP-CON	C	P	Continuous
CP-RTN	C	P	In rotation (P, BE, B)
C-KCON	C	K (Na) Mg	Continuous
C-KRTN	C	K (Na) Mg	In rotation (P, BE, B)
CPKCON	C	P K (Na) Mg	Continuous
CPKRTN	C	P K (Na) Mg	In rotation (P, BE, B)
DCON	None	D	Continuous
(D)CON	(D)	-	Continuous
(A)CON	(Ashes)	-	Continuous
-CON	None	-	Continuous

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Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 43 kg N.  
 C, castor meal to supply 96 kg N.  
 P: 35 kg P as single superphosphate (triple superphosphate in 1974).  
 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 until 1973).  
 Si: Silicate of soda at 450 kg.  
 D: Farmyard manure at 35 tonnes, (D): until 1871 only.  
 (Ashes): Weed ash 1852-1916, furnace ash 1917-1932. None since.

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

0	None
43	48
96	96
144	144

There are four extra plots testing all combinations of:-

1. MANURE

551AN2PK	Plot 551	A N2 P K	Continuous
561--PK	Plot 561	- P K	Continuous
571NN2--	Plot 571	N N2	Continuous
581NN2--	Plot 581	N N2	Continuous

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

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

0	None
35	35

Treatments to potatoes and beans:- All combinations of:-

1. MANURE Fertiliser and organic manures:

	To potatoes and beans:	
	1852-1966	1852-1976
C---	C	-
CP--	C	P
C-KMG	C	K (Na) Mg
CPKMG	C	P K (Na) Mg



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2. NRESID N		Nitrogen fertiliser (kg N), as 'Nitro-Chalk':	
Beans	Potatoes	Beans (residual effects, applied to previous potatoes)	Potatoes (applied 1976)
(0)	0	None	None
(96)	96	96	96
(192)	192	192	192
(288)	288	288	288

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

Standard applications:

Barley: Manures: Chalk at 2.9 t, to continuous barley plots only.  
Weedkillers: Dicamba with mecoprop and MCPA ('Tetralex Plus' at 7.0 l in 220 l) to 'Form of N 1852-1966 N and C' plots. Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 220 l) to all remaining plots.

Potatoes: Manures: Chalk at 2.9 t. Weedkillers: Linuron at 1.2 kg with paraquat at 0.42 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 450 l. Insecticide: Pirimicarb at 0.14 kg in 450 l. Haulm desiccant: Diquat at 0.6 kg in 220 l.

Seed: Barley: Julia, dressed with ethirimol, sown at 160 kg.  
Potatoes: Pentland Crown.  
Beans: Minden, sown at 220 kg.

Cultivations, etc.:-

All plots: P and K applied: 1 Oct, 1975. Chalk applied: 2 Oct. Silicate of soda applied: 6 Oct. Heavy spring-tine cultivated: 15 Oct. FYM applied: 13 Nov. Ploughed: 17 Nov. Spring-tine cultivated: 27 Feb, 1976.

Barley: Heavy spring-tine cultivated (except 'Form of N 1852-1966 N and C' plots and 'extra' plots): 14 Oct, 1975. Seed sown: 1 Mar, 1976. N applied: 26 Mar. 'Banlene Plus' applied: 14 May. 'Tetralex Plus' applied: 25 May. Combine harvested: 22 July.

Potatoes: N applied: 26 Mar. Spike rotary cultivated, seed mechanically planted: 29 Mar. Grubbed: 30 Mar. Weedkillers applied: 5 May. Insecticide applied: 17 June. Grubbed and rotary ridged: 21 June. Fungicide applied: 28 July. Haulm mechanically destroyed: 23 Sept. Haulm desiccant applied: 28 Sept. Lifted: 21 Oct.

Beans: Seed sown: 4 Mar. Tractor hoed: 27 Apr, 24 May. Combine harvested: 21 July.

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BARLEY

GRAIN TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---CON	1.00	1.19	1.08	1.32	1.15
-P-CON	1.43	1.48	1.40	1.98	1.57
--KCON	1.57	1.86	1.64	2.63	1.92
-PKCON	2.03	2.99	3.92	4.12	3.27
A--CON	0.74	0.74	0.97	1.09	0.88
AP-CON	1.09	1.33	1.12	1.29	1.21
A-KCON	1.07	1.00	1.18	1.41	1.17
APKCON	2.05	3.07	3.68	3.74	3.14
N--CON	0.98	0.84	0.99	1.07	0.97
N--SICON	2.12	2.78	2.26	2.63	2.45
N--RTN	2.19	1.84	2.11	1.83	1.99
N--SIRTN	2.78	2.76	3.05	2.78	2.84
NP-CON	1.56	1.85	1.99	1.92	1.83
NP-SICON	2.34	2.56	2.98	3.50	2.84
NP-RTN	2.91	3.20	3.37	3.58	3.26
NP-SIRTN	3.20	3.49	3.49	3.41	3.40
N-KCON	1.45	1.46	1.23	1.57	1.43
N-KSICON	2.09	2.31	2.80	3.70	2.73
N-KRTN	2.30	2.15	2.39	2.62	2.37
N-KSIRTN	2.90	3.04	3.16	3.62	3.18
NPKCON	2.20	3.13	3.64	3.71	3.17
NPKSICON	2.48	3.50	3.99	3.85	3.46
NPKRTN	3.05	4.07	4.15	4.43	3.92
NPKSIRTN	3.33	3.84	4.50	4.45	4.03
C--CON	2.20	2.48	2.63	2.85	2.54
C--RTN	2.55	2.98	2.57	2.99	2.77
CP-CON	2.13	2.50	2.65	3.00	2.57
CP-RTN	2.86	2.78	3.13	3.13	2.98
C-KCON	1.89	2.63	2.69	3.13	2.59
C-KRTN	2.48	3.13	3.21	3.14	2.99
CPKCON	2.13	3.22	3.63	3.71	3.17
CPKRTN	3.32	4.16	4.45	4.49	4.10
DCON	4.65	4.25	4.44	4.47	4.45
(D)CON	1.92	3.27	2.49	2.84	2.63
(A)CON	1.86	1.81	1.81	1.56	1.76
-CON	1.39	1.80	1.55	2.01	1.69
MEAN	2.17	2.54	2.68	2.88	2.57

GRAIN MEAN DM% 86.0



76/R/HB/2

BARLEY

STRAW TONNES/HECTARE

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

N	0	48	96	144	MEAN
MANURE					
---CON	0.61	0.60	0.62	0.62	0.61
-P-CON	0.61	0.62	0.82	0.81	0.71
--KCON	0.81	1.02	1.02	1.61	1.11
-PKCON	0.81	1.44	1.83	2.26	1.59
A--CON	0.41	0.42	0.42	0.63	0.47
AP-CON	0.84	0.81	0.83	0.84	0.83
A-KCON	0.63	0.81	0.82	0.80	0.76
APKCON	0.83	1.47	1.85	1.88	1.51
N--CON	0.69	0.70	0.69	0.69	0.70
N--SICON	0.72	1.08	1.06	1.06	0.98
N--RTN	1.07	1.02	1.05	1.04	1.05
N--SIRTN	1.43	1.41	1.39	1.41	1.41
NP-CON	1.74	1.74	1.35	1.71	1.64
NP-SICON	1.78	1.41	1.41	1.78	1.60
NP-RTN	1.03	1.37	1.39	1.72	1.38
NP-SIRTN	0.71	0.69	1.06	0.72	0.79
N-KCON	2.03	1.38	2.03	1.02	1.61
N-KSICON	1.75	2.10	2.11	1.07	1.76
N-KRTN	2.43	2.39	2.05	1.37	2.06
N-KSIRTN	2.78	2.37	2.03	1.71	2.22
NPKCON	1.04	0.69	1.39	1.39	1.13
NPKSICON	1.41	1.40	1.07	1.76	1.41
NPKRTN	1.40	1.39	1.38	1.04	1.30
NPKSIRTN	1.39	1.41	1.74	0.70	1.31
C--CON	1.12	1.06	1.11	0.74	1.01
C--RTN	1.83	1.47	1.09	1.47	1.47
CP-CON	1.46	1.77	2.14	2.19	1.89
CP-RTN	1.45	1.09	1.82	2.22	1.64
C-KCON	1.07	1.46	1.05	1.08	1.17
C-KRTN	1.07	1.43	1.80	1.45	1.43
CPKCON	1.08	1.43	2.17	2.18	1.71
CPKRTN	1.43	1.77	2.48	2.51	2.05
DCON	3.05	2.73	3.02	2.98	2.95
(D)CON	0.81	1.64	1.33	1.61	1.35
(A)CON	0.84	1.11	1.10	0.83	0.97
-CON	0.85	0.80	0.81	1.09	0.89
MEAN	1.25	1.32	1.43	1.39	1.35

STRAW MEAN DM% 87.5

76/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

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

MANURE MAGNESIUM	551AN2PK	561--PK	571NN2-	581NN2-	MEAN
0	3.22	1.51	2.52	1.24	2.12
35	3.66	1.57	2.27	1.22	2.18
MEAN	3.44	1.54	2.39	1.23	2.15

GRAIN MEAN DM% 85.3

STRAW TONNES/HECTARE

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

MANURE MAGNESIUM	551AN2PK	561--PK	571NN2-	581NN2-	MEAN
0	1.76	0.70	1.06	0.52	1.01
35	2.11	0.68	1.05	0.70	1.13
MEAN	1.93	0.69	1.05	0.61	1.07

STRAW MEAN DM% 90.6

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POTATOES

TOTAL TUBERS TONNES/HECTARE

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

N	0	96	192	288	MEAN
MANURE					
C---	12.3	12.3	17.3	22.3	16.0
CP--	16.8	16.3	19.0	19.1	17.8
C-KMG	28.3	32.6	35.0	36.4	33.1
CPKMG	29.8	36.1	40.3	41.7	37.0
MEAN	21.8	24.3	27.9	29.9	26.0

PERCENTAGE WARE 3.81 CM (1.5 INCH RIDDLE)

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

N	0	96	192	288	MEAN
MANURE					
C---	87.7	88.5	93.9	93.1	90.8
CP--	92.5	92.3	93.9	91.8	92.6
C-KMG	98.0	96.5	96.0	97.4	97.0
CPKMG	96.4	96.1	97.5	97.2	96.8
MEAN	93.6	93.3	95.4	94.9	94.3

PLOT AREA HARVESTED 0.00191

BEANS

GRAIN TONNES/HECTARE

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

NRESID	(0)	(96)	(192)	(288)	MEAN
MANURE					
C---	0.42	0.55	0.41	0.48	0.46
CP--	0.34	0.35	0.42	0.28	0.35
C-KMG	0.28	0.42	0.49	0.63	0.45
CPKMG	0.49	0.77	0.55	0.76	0.64
MEAN	0.38	0.52	0.47	0.54	0.48

GRAIN MEAN DM% 84.2

SUB PLOT AREA HARVESTED 0.00143