

Thank you for using eradoc, a platform to publish electronic copies of the Rothamsted Documents. Your requested document has been scanned from original documents. If you find this document is not readable, or you suspect there are some problems, please let us know and we will correct that.



ROTHAMSTED  
RESEARCH

## Yields of the Field Experiments 1988

[Full Table of Content](#)



### **88/R/RN/17 Rates of P and K to the Subsoil - S. Beans, W. Wheat, Potatoes, S. Barley**

#### **Rothamsted Research**

Rothamsted Research (1989) *88/R/RN/17 Rates of P and K to the Subsoil - S. Beans, W. Wheat, Potatoes, S. Barley*; Yields Of The Field Experiments 1988, pp 68 - 75 - DOI:

<https://doi.org/10.23637/ERADOC-1-43>

88/R/RN/17

RATES OF P AND K TO THE SUBSOIL

**Object:** To study the effects of a range of rates and frequencies of application of P and K to the subsoil, singly and together, on the yields and nutrient uptakes of a rotation of crops - Meadow.

**Sponsors:** J. McEwen, A.E. Johnston.

The eighth year, potatoes, s. barley, s. beans, w. wheat.

For previous years see 81-87/R/RN/17.

**Design:** 4 series (for crops) each of 40 plots.

**Whole plot dimensions:** 3.0 x 14.0.

**Treatments to each series:**

**TREATMNT** Extra P and K and primary cultivation tool in autumn 1980 only, except on A plots, treatments repeated annually, and F plots treatments repeated four yearly:

	P2O5 (kg)	K2O (kg)	Tool	
- - -	0	0	Plough	(duplicated)
P6 K6 T	1000	500 to topsoil	"	( " )
- - S	0	0	Wye double-digger	(triplicated)
- - SA	0	0	" " "	(duplicated)
- - SF	0	0	" " "	
P2 - SA	63	0 to subsoil	" " "	
P3 - SF	125	0 " "	" " "	
P4 - S	250	0 " "	" " "	
P5 - S	500	0 " "	" " "	
P5 - SF	500	0 " "	" " "	
P6 - S	1000	0 " "	" " "	
- K2 SA	0	31 " "	" " "	
- K3 SF	0	63 " "	" " "	
- K4 S	0	125 " "	" " "	
- K5 S	0	250 " "	" " "	
- K5 SF	0	250 " "	" " "	
- K6 S	0	350 " "	" " "	
P1 K1 SA	31	16 " "	" " "	
P1 K3 SA	31	63 " "	" " "	
P2 K2 SA	63	31 " "	" " "	
P3 K1 SA	125	16 " "	" " "	
P3 K3 SA	125	63 " "	" " "	
P3 K4 SF	125	125 " "	" " "	
P4 K3 SF	250	63 " "	" " "	
P4 K4 S	250	125 " "	" " "	
P4 K5 S	250	250 " "	" " "	
P4 K5 SF	250	250 " "	" " "	
P4 K6 S	250	350 " "	" " "	
P5 K4 S	500	125 " "	" " "	
P5 K4 SF	500	125 " "	" " "	
P5 K5 S	500	250 " "	" " "	
P5 K6 S	500	350 " "	" " "	
P6 K4 S	1000	125 " "	" " "	
P6 K5 S	1000	250 " "	" " "	
P6 K6 S	1000	350 " "	" " "	

88/R/RN/17

- NOTES:** (1) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
- (2) The topsoil PK dressing was equally divided before and after ploughing.
- (3) All plots were conventionally ploughed each autumn unless the Wye double-digging treatment was due.
- (4) The rate of 350 kg K<sub>2</sub>O applied was in error for 500 kg K<sub>2</sub>O.

**Standard applications:**

- Potatoes: Manures: (10:10:15+4.5 Mg) at 1960 kg. Weedkiller: Linuron at 1.6 kg in 260 l. Fungicides: Mancozeb at 1.4 kg in 200 l on five occasions, applied with the insecticide on the first two occasions. Manganese zinc ethylene bisdithiocarbamate at 1.4 kg in 200 l. Fentin hydroxide at 0.27 kg in 200 l. Insecticide: Pirimicarb at 0.14 kg. Desiccant: Diquat at 0.80 kg ion in 200 l.
- S. barley: Manures: (20:10:10) at 630 kg. Weedkillers: Mecoprop at 2.4 kg with clopyralid at 0.05 kg and bromoxynil at 0.24 kg in 200 l. Fungicides: Fenpropimorph at 0.75 kg in 200 l. Propiconazole at 0.12 kg and tridemorph at 0.25 kg in 200 l.
- S. beans: Weedkiller: Simazine at 1.2 kg in 200 l. Insecticide: Phorate at 4.5 kg.
- W. wheat: Manures: (0:18:36) at 350 kg. 'Nitram' at 120 kg and later at 480 kg. Weedkillers: Chlortoluron at 3.5 kg in 200 l. Fluroxypyr at 0.20 kg with clopyralid at 0.07 kg and bromoxynil at 0.34 kg in 200 l. Fungicides: Propiconazole at 0.12 kg and tridemorph at 0.25 kg in 200 l.

- Seed:** Potatoes: Pentland Crown.  
S. barley: Klaxon, sown at 160 kg.  
S. beans: Minden, sown at 250 kg.  
W. wheat: Avalon, sown at 200 kg.

**Cultivations, etc.:-**

- All crops: Treatments applied by double-digger: 3 Nov, 1987 and 10 Nov. Ploughed: 13 Nov.
- Potatoes: NPK+Mg applied, rotary harrowed, potatoes planted: 6 Apr, 1988. Rotary ridged: 25 Apr. Linuron applied: 5 May. Mancozeb with pirimicarb applied: 15 June, 30 June. Manganese zinc ethylene bisdithiocarbamate applied: 8 July. Mancozeb applied: 18 July, 1 Aug, 15 Aug. Fentin hydroxide applied: 30 Aug. Haulm mechanically destroyed: 14 Sept. Desiccant applied: 19 Sept. Lifted: 1 Nov.
- S. barley: Heavy spring-tine cultivated twice: 7 Mar, 1988. NPK applied, heavy spring-tine cultivated, rotary harrowed, seed sown: 8 Mar. Weedkillers applied: 11 May. Fenpropimorph applied: 17 May. Remaining fungicide applied: 20 June. Combine harvested: 15 Aug.
- S. beans: Heavy spring-tine cultivated: 7 Mar, 1988. Phorate applied, heavy spring-tine cultivated: 8 Mar. Rotary harrowed, seed sown: 10 Mar. Weedkiller applied: 17 Mar. Combine harvested: 19 Sept.

88/R/RN/17

**Cultivations, etc.:-**

W. wheat: PK applied: 16 Nov, 1987. Rotary harrowed, seed sown:  
17 Nov. Chlortoluron applied: 30 Nov. First N applied: 1 Mar,  
1988. Second N applied: 21 Apr. Remaining weedkillers applied:  
26 Apr. Fungicides applied: 20 June. Combine harvested: 23 Aug.

88/R/RN/17

SERIES II POTATOES

TOTAL TUBERS TONNES/HECTARE

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

TREATMNT	
- - -	63.1
P6 K6 T	67.4
- - S	65.2
- - SA	60.7
- - SF	61.0
P2 - SA	62.6
P3 - SF	60.4
P4 - S	62.9
P5 - S	64.9
P5 - SF	64.9
P6 - S	58.1
- K2 SA	65.8
- K3 SF	67.9
- K4 S	64.2
- K5 S	67.9
- K5 SF	64.1
- K6 S	66.3
P1 K1 SA	61.7
P1 K3 SA	62.0
P2 K2 SA	59.4
P3 K1 SA	65.7
P3 K3 SA	64.5
P3 K4 SF	58.7
P4 K3 SF	60.9
P4 K4 S	62.0
P4 K5 S	63.1
P4 K5 SF	69.6
P4 K6 S	69.5
P5 K4 S	61.1
P5 K4 SF	63.9
P5 K5 S	62.1
P5 K6 S	64.9
P6 K4 S	59.6
P6 K5 S	62.8
P6 K6 S	67.1
Mean	63.7

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

TREATMNT	
	3.72 min.rep
	3.04 max-min

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

Stratum	d.f.	s.e.	cv%
WP	5	2.63	4.1

88/R/RN/17

SERIES II POTATOES

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

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

TREATMNT	
- - -	98.9
P6 K6 T	98.9
- - S	98.3
- - SA	98.5
- - SF	97.8
P2 - SA	98.4
P3 - SF	99.0
P4 - S	98.6
P5 - S	99.1
P5 - SF	97.3
P6 - S	97.7
- K2 SA	98.5
- K3 SF	97.5
- K4 S	99.0
- K5 S	98.8
- K5 SF	99.1
- K6 S	98.4
P1 K1 SA	98.1
P1 K3 SA	98.8
P2 K2 SA	97.9
P3 K1 SA	98.4
P3 K3 SA	98.1
P3 K4 SF	99.2
P4 K3 SF	98.5
P4 K4 S	98.9
P4 K5 S	97.7
P4 K5 SF	98.5
P4 K6 S	99.0
P5 K4 S	98.4
P5 K4 SF	98.4
P5 K5 S	98.3
P5 K6 S	99.2
P6 K4 S	97.3
P6 K5 S	98.0
P6 K6 S	98.4
Mean	98.4

PLOT AREA HARVESTED 0.00210

\* SEDs apply only to - - -, P6 K6 T, - - S and - - SA

TREATMNT  
max-min - - S v any of remainder  
min.rep any of remainder

88/R/RN/17

SERIES III BARLEY

GRAIN TONNES/HECTARE

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

TREATMNT	
- - -	7.21
P6 K6 T	7.11
- - S	6.89
- - SA	6.83
- - SF	7.00
P2 - SA	6.75
P3 - SF	6.75
P4 - S	7.28
P5 - S	6.74
P5 - SF	6.98
P6 - S	7.37
- K2 SA	7.16
- K3 SF	7.14
- K4 S	6.85
- K5 S	7.44
- K5 SF	6.98
- K6 S	6.93
P1 K1 SA	6.93
P1 K3 SA	7.28
P2 K2 SA	7.00
P3 K1 SA	6.95
P3 K3 SA	7.09
P3 K4 SF	6.88
P4 K3 SF	6.75
P4 K4 S	7.16
P4 K5 S	6.81
P4 K5 SF	7.04
P4 K6 S	7.30
P5 K4 S	7.01
P5 K4 SF	6.83
P5 K5 S	7.06
P5 K6 S	6.73
P6 K4 S	6.58
P6 K5 S	6.55
P6 K6 S	6.86
Mean	6.98

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

TREATMNT	
0.356	min.rep
0.291	max-min

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

Stratum	d.f.	s.e.	cv%
WP	5	0.252	3.6
GRAIN MEAN DM%	85.1	PLOT AREA HARVESTED	0.00286

88/R/RN/17

SERIES IV BEANS

GRAIN TONNES/HECTARE

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

TREATMNT	
- - -	6.78
P6 K6 T	7.31
- - S	6.88
- - SA	6.63
- - SF	6.92
P2 - SA	7.15
P3 - SF	7.60
P4 - S	7.03
P5 - S	6.45
P5 - SF	7.43
P6 - S	6.66
- K2 SA	6.84
- K3 SF	6.82
- K4 S	6.68
- K5 S	6.89
- K5 SF	6.88
- K6 S	6.56
P1 K1 SA	6.98
P1 K3 SA	7.04
P2 K2 SA	6.99
P3 K1 SA	6.69
P3 K3 SA	6.78
P3 K4 SF	7.42
P4 K3 SF	7.08
P4 K4 S	6.81
P4 K5 S	6.67
P4 K5 SF	6.83
P4 K6 S	7.43
P5 K4 S	7.13
P5 K4 SF	6.94
P5 K5 S	6.94
P5 K6 S	7.00
P6 K4 S	6.72
P6 K5 S	7.56
P6 K6 S	7.09
Mean	6.95

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

TREATMNT	
0.220	min.rep
0.179	max-min

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

Stratum	d.f.	s.e.	cv%
WP	5	0.155	2.2
GRAIN MEAN DM%	86.1	PLOT AREA HARVESTED	0.00386



88/R/RN/17

SERIES I WHEAT

GRAIN TONNES/HECTARE

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

TREATMNT	
- - -	7.96
P6 K6 T	7.75
- - S	7.73
- - SA	7.62
- - SF	7.30
P2 - SA	8.13
P3 - SF	6.70
P4 - S	7.61
P5 - S	7.57
P5 - SF	7.30
P6 - S	7.66
- K2 SA	8.47
- K3 SF	8.24
- K4 S	8.46
- K5 S	7.46
- K5 SF	7.94
- K6 S	7.57
P1 K1 SA	7.64
P1 K3 SA	7.85
P2 K2 SA	8.14
P3 K1 SA	8.14
P3 K3 SA	7.98
P3 K4 SF	7.86
P4 K3 SF	7.93
P4 K4 S	7.83
P4 K5 S	7.52
P4 K5 SF	7.59
P4 K6 S	7.62
P5 K4 S	8.33
P5 K4 SF	7.92
P5 K5 S	7.68
P5 K6 S	8.63
P6 K4 S	7.76
P6 K5 S	8.29
P6 K6 S	7.44
Mean	7.81

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

TREATMNT	
	0.180 min.rep
	0.147 max-min

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

Stratum	d.f.	s.e.	cv%
WP	5	0.127	1.6
GRAIN MEAN DM%	83.1	PLOT AREA HARVESTED	0.00286