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## Woburn long-term liming experiment lime and fertilizer treatments 1962-1996

**DOI:** [10.23637/wcs10-Treatments-01](https://doi.org/10.23637/wcs10-Treatments-01)

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**Published by:** Rothamsted Research

**Date:** December 2020, updated November 2023 with corrected P application rate in 1982 (50kgP instead of 25kgP, P1 and P3).

**Description:** Contains details of the lime applications, fertilizer treatments and basal fertilizer applied to the Long-term Liming Experiment at Woburn, 1962-1996.

- 1) Details of lime application dates and amounts applied, 1962-1996.
- 2) Details of fertilizer treatments (P, K, Mg, Mn and S), application amounts, dates and forms, 1962-1996.
- 3) Details of basal fertilizer (N, K and Mg), application amounts and forms, 1962-1996.

**Site:** W/CS/10. Stackyard field Section 3, Woburn Experimental Farm, Husborne Crawley, Woburn, Bedfordshire, UK. Latitude 52.0003, Longitude -0.6149

### Related Resources:

- Woburn long-term liming experiment standard plans, 1962-1996 [10.23637/wcs10-Plans](https://doi.org/10.23637/wcs10-Plans)
- Refer to website for more details: <http://www.era.rothamsted.ac.uk/>

**Cite as:** Glendining M.J. (2020) *Woburn long-term liming experiment lime and fertilizer treatments 1962-1996*. *Electronic Rothamsted Archive, Rothamsted Research*. [10.23637/wcs10-Treatments](https://doi.org/10.23637/wcs10-Treatments)

**Funding:** Rothamsted Research receives strategic funding from the UK Biotechnology and Biological Sciences Research Council (BBSRC). The Rothamsted Long-term Experiments National Capability is supported by the BBSRC Grant BBS/E/C/000J0300 and the Lawes Agricultural Trust.

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**Woburn Long-term Liming experiment.**  
**Lime application dates and amounts**

**W/CS/10**  
**1962-1996**

**Woburn (Stackyard) total lime applied, 1962-1987:                      Ground chalk (CaCO<sub>3</sub>) tha<sup>-1</sup>**

Harvest Year	1962	1963	1979	1982	1983	1987
Date applied	09/03/1962	19/10/1962	21/11/1978	25/11/1981	04/11/1982	13/11/1986
Lime Treatment						
None (0)	0	0	0	0	0	0
Low (L)	5	0	1	2	0	1
Medium (M)	10	2	2	5	5	1.5
High (H)	15	4	4	10	10	2.5

**Summary of total lime applied, 1962-1987, Ground chalk (CaCO<sub>3</sub>) tha<sup>-1</sup>:**

Lime Treatment	Rothamsted	Woburn
0	0	0
L	15	9
M	24.5	25.5
H	52.5	45.5

Lime applied in 1962 and 1963 was local soft cretaceous ground limestone (chalk).  
 It contained 34.8% Ca and 0.2% Mg soluble in HCl (Bolton 1977).

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 Please acknowledge e-RA and Rothamsted Research as the data source in any publications.

Bolton, 1977: [DOI: https://doi.org/10.1017/S0021859600027222](https://doi.org/10.1017/S0021859600027222)

**Woburn Long-term Liming experiment.**  
W/CS/10

**Fertilizer treatments**

**1962-1996**

Period 1 Harvest Year	P treatments kgP/ha		Date P, K and Mg applied	K treatment kgK/ha		Mg treatment kgMg/ha	
	0	Annual P		0	K	0	Mg
1962	0	27.5	15/03/1962	0	104		
1963	0	27.5	13/03/1963	0	104		
1964	0	27.5	08/11/1963	0	104		
1965	0	27.5	29/03/1965	0	104		
1966	0	27.5	10/03/1966	0	104		
1967	0	27.5	24/02/1967	0	104		
1968	0	55	28/03/1968	0	156		
1969	0	0	-	0	0		
1970	0	27.5	26/03/1970	0	104		
1971	0	27.5	04/03/1971	0	104		
1972	0	27.5	14/03/1972	0	104		
1973	0	27.5	28/02/1973	0	104		
1974	0	55	16/04/1974	0	156	0	112
1975	0	27.5	17/03/1975	0	105	0	0
1976	0	27.5	26/03/1976	0	105	0	112
1977	0	27.5	18/03/1977	0	105	0	112
1978	0	27.5	13/03/1978	0	105	0	112
1979	0	0	-	0	0		
1980	0	0	-	0	0		
<b>Total</b>	<b>0</b>	<b>495</b>		<b>0</b>	<b>1772</b>	<b>0</b>	<b>448</b>

Period 2	Divided into 4 P treatments:				Date P applied	Mn treatment kgMn/ha		S treatment kgS/ha	
	P0	P1	P2	P3		0	Mn	0	S
1981	0	25	25	75	08/12/1980				
1982 <sup>5</sup>	0	50	0	50	24/03/1982				
1983	0	50	50	100	22/03/1983				
1984	0	0	0	0	-				
1985	0	0	0	0	-				
1986	0	0	0	0	-				
1987	0	0	0	0	-	0	0.76		
1988	0	25	25	75	10/02/1988	0	0.31		
1989	0	0	0	0	-	0	0.29		
1990	0	0	0	0	-	0	0.10*		
1991	0	0	0	0	-			0	30
1992	0	0	0	0	-			0	30
1993	0	0	0	0	-			0	0
1994	0	0	0	0	-			0	30
1995	0	0	0	0	-			0	30
1996	0	0	0	0	-			0	30
<b>Total</b>	<b>0</b>	<b>150</b>	<b>100</b>	<b>300</b>				<b>0</b>	<b>150</b>

**Phosphorus (P) treatments:**

**Period 1: 1962-1980 two P treatments (0, P)**

1962-1978 Applied as superphosphate. Not applied to fallow (1969, 1979, 1980)

1968, 1974 55 kgP/ha to potatoes

**Period 2: 1981-1996 four P treatments (P0, P1, P2, P3):**

**P0, P1** No P applied Period 1

**P2, P3** Total of 495kgP/ha applied Period 1

1981-83, 1988 Applied as superphosphate

1982<sup>5</sup> In Field Plans shown as 50kgP/ha,

in some Yield Books shown as 25kgP/ha, though this is probably an error.

**Potassium (K) treatment:**

1962-1978 Applied as potassium chloride  
1981 onwards Basal application to all plots in some years

**Magnesium (Mg) treatment:**

1974, 1976-78 Applied as Epsom salts (1974, 1976-77) and kieserite (magnesium sulphate) (1978)  
1981 onwards Basal application to all plots in some years

**Manganese (Mn) treatment:**

1987-1990 Divided into two applications of liquid foliar fertilizer at fourth leaf stage  
(usually May/June) and before flowering (usually June/July).  
\*First dose only applied in 1990 as crop failed

**Sulphur (S) treatment:**

1991-1996 Applied as calcium sulphate. Not applied in 1993 as crop failed

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**Woburn Long-term Liming experiment.**  
W/CS/10 1962-1996

**Basal Fertilizer**  
(applied to all plots, not a treatment factor)

Year	Fertilizer N		Potassium kgK/ha	Magnesium kgMg/ha
	kgN/ha Woburn	Type Woburn		
1962	0			
1963	0			
1964	32	Nitrochalk		
1965	63	Nitrochalk		
1966	126	AS & nitrochalk		
1967	126	AS & nitrochalk		
1968	251	Nitrochalk		
1969	0			
1970	126	Nitrochalk		
1971	126	Nitrochalk		
1972	130	Nitrochalk		
1973	130	Nitrochalk		
1974	250	Nitrochalk		
1975	80	Nitrochalk		
1976	170	Nitrochalk		
1977	95	Nitrochalk		
1978	130	Nitrochalk		
1979	0			
1980	0			
1981	80	Nitrochalk	120	100
1982	80	Nitrochalk	120	40
1983	260	Nitrochalk	210	40
1984	0		0	0
1985	123	Compound	79	0
1986	190	Nitram	0	0
1987	0		0	0
1988	86	Nitram	80	17
1989	0		0	0
1990	0		0	0
1991	250	Compound & Nitram	32	26
1992	126	Compound & Nitram	32	0
1993	0		0	0
1994	0		0	0
1995	160	Nitram	0	0
1996	160	Nitram	0	0

**Nitrogen (N) fertilizers:**

AS = Ammonium sulphate

Nitrochalk = calcium ammonium nitrate

Nitram = ammonium nitrate

Compound = 25:0:16 compound fertilizer (% N:P:K)

**Potassium (K) fertilizer**

1981 onwards, as potassium chloride or compound (1985, 1991, 1992)

**Magnesium (Mg) fertilizer:**

1981 onwards, as magnesium sulphate or liquid chelated magnesium (1991)

Dolomitic limestone (magnesium calcium carbonate) was applied in some years at Woburn, as a source of magnesium (Paul Poulton, *pers. comm.*)

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