

# Park Grass      Chalk applications as CaCO<sub>3</sub> t/ha since 1960

Plot	Treatment	Date applied Season Sub-plot	28/12/63		13/12/67					12/01/90	21/01/94	07/01/97	20/03/00	07/07/03	21/11/05	11/12/08 &	Total input 1965-2009
			27/01/60	& 11/1/64	06/01/65	24/01/67	& 28/12/67	29/11/71	19/01/76	& 2/3/90	& 8/2/94	& 31/1/97	& 22/3/00	& 23/7/03	& 22/11/05	14-20/01/09	
			1960	1964	1965	1967	1968	1972	1976	1990	1994	1997	2000	2003	2006	2009	
1	N1	a	4.00	4.00			2.00	2.00	3.80	8.70	7.00	3.00	3.00	1.50	1.50	1.50	34.0
		b	4.00	4.00						5.90	1.50	1.50	1.50	1.00	0.75	0.75	12.9
		c			6.30	3.10	3.10			6.70	0.75	1.50	0.75	0.75	0.75	0.75	24.5
		d															0.0
2/1	K Since 1996	a	4.00	4.00			2.00	2.00		6.40	7.00	3.00	3.00	1.50	0.75	1.00	26.7
		b	4.00	4.00								0.75	0.75	1.00	0.75	1.00	4.3
		c								1.00	0.30	0.30	0.30	0.30	0.30	0.50	3.0
		d															0.0
2/2	None	a	4.00	4.00			2.00	2.00		6.40	7.00	3.00	3.00	1.50			24.9
		b	4.00	4.00								0.75	0.75	0.75	0.30	0.50	3.1
		c								1.00	0.30	0.30				0.30	1.9
		d															0.0
3	None	a	4.00	4.00			2.00	2.00		6.50	7.00	3.00	3.00	1.50	0.50	0.50	26.0
		b	4.00	4.00						4.70		0.75				0.50	6.0
		c								1.10	0.30					0.50	1.9
		d															0.0
4/1	P	a	4.00	4.00			2.00	2.00		4.50	7.00	3.00	3.00	1.50	1.50	2.00	26.5
		b	4.00	4.00								0.75	0.75	0.75	0.30	0.30	2.9
		c									0.30	0.30	0.30				0.9
		d															0.0
4/2	N2P	a	4.00	4.00			2.00		12.60	7.60	12.10	5.10	6.00	4.00	4.00	4.00	57.4
		b	4.00	4.00	2.50		1.30			5.40	8.60	3.60	3.60	2.00	1.00	1.00	29.0
		c			11.30	5.70	5.70			3.80	3.60	2.10	1.50	2.00	1.00	1.00	37.7
		d															0.0
6	N1PKNaMg	a					7.50		6.30	4.60	7.00	3.00	3.00	3.00	3.00	4.00	41.4
		b					7.50				1.50	1.50	1.50	1.50	2.00	3.00	18.5

Plot	Treatment	Sub-plot	1960	1964	1965	1967	1968	1972	1976	1990	1994	1997	2000	2003	2006	2009	Total
7	PKNaMg	a	4.00	4.00			2.00	2.00	3.80	4.10	7.00	3.00	3.00	2.00	2.00	3.00	31.9
		b	4.00	4.00								0.75	0.75	2.00	1.50	1.00	6.0
		c								2.30	0.30	0.30	0.30	0.30	0.30	0.50	4.3
		d															0.0
8	PNaMg	a	4.00	4.00			2.00	2.00		4.00	7.00	3.00	3.00	2.00	2.00	3.00	28.0
		b	4.00	4.00								0.75	0.75	0.75	0.50	0.50	3.3
		c									0.30	0.30	0.30			0.30	1.2
		d															0.0
9/1 (N2)PKNaMg N2 until 1989	a	4.00	4.00			2.00	2.00	13.80		21.00	6.00	6.00	3.00	3.00	3.00	2.00	58.8
	b	4.00	4.00	5.00		2.50				11.50	1.50	1.50		0.75	0.75	0.75	23.5
	c			8.80	4.40	4.40				8.75	1.50	1.50				1.00	30.4
	d																0.0
9/2 N2PKNaMg	a	4.00	4.00			2.00	2.00	13.80	9.50	15.10	10.20	6.00	4.00	3.00	3.00	3.00	68.6
	b	4.00	4.00	5.00		2.50			6.40	8.60	3.60	3.60	2.00	3.00	2.00	2.00	36.7
	c			8.80	4.40	4.40			4.30	5.10	2.10	3.00	3.00	1.00	2.00	2.00	38.1
	d																0.0
10 N2PNaMg	a	4.00	4.00			2.00		16.30	4.40	12.10	10.20	6.00	4.00	3.00	3.00	4.00	62.0
	b	4.00	4.00	2.50		1.30			3.30	8.60	7.20	5.00	2.00			1.50	31.4
	c			10.00	5.00	5.00			2.70	5.10	4.20	2.10	2.00	0.50	1.00	1.00	37.6
	d																0.0
11/1 N3PKNaMg	a	4.00	4.00			4.00		20.70	3.80	22.00	12.00	12.00	5.00	5.00	5.00	5.00	89.5
	b	4.00	4.00	12.60	6.30	6.30			8.50	10.50	4.50	4.50	2.00	1.00	1.50	1.50	57.7
	c			10.00	5.00	5.00			3.70	9.00	6.00	3.00	3.00	1.50	2.00	2.00	48.2
	d																0.0
11/2 N3PKNaMgSi	a	4.00	4.00			4.00		19.50	6.20	14.00	12.00	10.20	5.00	4.00	3.00	3.00	77.9
	b	4.00	4.00	7.50	3.80	3.80			4.20	10.50	4.50	5.00	2.00	1.00	1.50	1.50	43.8
	c			10.00	5.00	5.00			3.20	9.00	3.00	3.00	1.50	1.50	1.50	1.50	42.7
	d																0.0
12 None	a								18.20	3.20	3.00	3.00	3.00	1.50	1.50	2.00	35.4
	b								7.50	4.30	0.75		0.75	0.75	1.00	1.00	15.1
	c										0.30					0.30	0.6
	d																0.0
13/1 None D/F until 1994	a	4.00	4.00			2.00	2.00		5.10	5.00	3.00	3.00	2.00	1.50	2.00	2.00	25.6
	b	4.00	4.00										0.75	0.75	1.00	1.00	2.5
	c			2.50		1.30				0.30			0.30	0.30	0.30	0.30	5.0
	d																0.0

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**Notes:**

**See also Park Grass Lime Chalk Applies 1856-1902 for more detail.**

In Jan 1881, lime was applied to small areas of plots 1-13.

In Nov 1883, lime was applied to the half of each plot farthest away from the Manor (the western half of plots 1-17; possibly the southern half of plots 18-20).

In Nov 1887, lime was applied to the other half of all plots (except plot 5); in Dec 1896, lime was applied to that half of plot 5 that had not previously received any.

**See also Park Grass Lime Chalk Applies 1903-1964 for more detail.**

From 1903, lime was made a test on half of 13 plots (16 and 1-13 except 5/1, 5/2, 6 and 12); 4.0 t/ha CaCO<sub>3</sub> was applied every 4 years to half plots (see below and **1903-1964** sheet for exceptions). Three more plots (14, 15 and 17) were divided in 1920 to test lime.

The half-plots were designated as either Limed (L) [area equivalent to current sub-plots "a" and "b"] or Unlimed (U) [area equivalent to "c" and "d"]

Yields were taken from the "Limed" (southern) half and "Unlimed" (northern) half of each plot.

In 1920, plots 18, 19 and 20 were also divided (each into three sub-plots) to test different rates of lime; yields were recorded for each sub-plot.

**See above for chalk applications 1965 onwards:**

In 1965, most plots were further divided (into four sub-plots) with the intention of liming the "a" "b" and "c" sub-plots, where necessary, to achieve, and then maintain, pH 7, 6 and 5 respectively; the "d" sub-plot were left unlimed. The "a" and "b" subplots were on the previously Limed halves of the plot, the "c" and "d" sub-plots were on the previously Unlimed halves of the plot. Plot 18 was partially included in this new scheme; 18/3 was divided into "a" and "b", 18/1 was divided into "c" and "d". Yields are recorded on each of the four sub-plots.

Sub-plots 18/2, 19/1, 19/2, 19/3, 20/1, 20/2, 20/3 were not included in the new liming scheme but yields are still recorded.

Plot 15 was not divided into the a, b, c, d sub-plots until 1976; yields were recorded on the Limed and Unlimed half-plots from 1920-75; from 1965-75 the half-plots being equivalent to the areas later divided into "a" & "b" and "c" & "d" sub-plots.

Plot 12 was never divided to test with and without lime and was not fully included in the a, b, c, d scheme until 1976. Yields were recorded on whole plots until 1964 and by half-plots from 1965-75 (the half-plots being equivalent to the areas later divided into "a" & "b" and "c" & "d" sub-plots).

From 1965, plots 5/1, 5/2 and 6 were used for microplots. Parts of plot 6 (6a & 6b) have been re-included in the main expt since 1972 and first received chalk in 1968. The other half of plot 6 and plots 5/1 and 5/2 have remained unlimed and outside the main experiment.

When the decision was made to divide the plots into four and aim for pH 7, 6 and 5 on the "a", "b" and "c" subplots there was great concern that the very large amounts of chalk needed to raise pH on some treatments (i.e. those that had become very acid) might have a harmful effect on the sward. Initially, therefore, although the plots were split into "a", "b", "c" and "d", and yields were taken from each subplot (with some exceptions), only the "b" and "c" subplots received the very large amounts of chalk (where necessary) in 1965, 1967 and 1968. Thus, if there had been any harmful effects on the sward, subplots "a" and "d" would not have been affected. Most of the "a" subplots received 2.0 or 4.0 t/ha chalk in 1968 and 1972. As it turned out there were no obvious ill effects on the sward and the very large dressings needed (on some) of the "a" subplots started in 1976. Because soil samples were not taken regularly at that time, and thus pH was not being monitored regularly, the next chalk dressings were not applied until 1990. Clearly, this was not satisfactory, and, to avoid large fluctuations in pH, the scheme was revised for 1994.

Chalk is now applied on a regular 3-year cycle (weather permitting); the amounts applied are based on the analysis of soils also taken on a regular 3-year cycle.