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# Botanical Composition of the Park Grass Plots at Rothamsted 1856-1976



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## Tables

### Rothamsted Research

Rothamsted Research (1978) *Tables* ; Botanical Composition Of The Park Grass Plots At Rothamsted 1856-1976, pp 18L - 61 - DOI: <https://doi.org/10.23637/ERADOC-1-156>

TABLE 1a

Amounts of fertilisers applied to the Park Grass plots

**Nitrogen**, applied in spring.

N<sub>1</sub>, N<sub>2</sub> or N<sub>3</sub>, ammonium sulphate supplying 48, 96 or 144 kg N ha<sup>-1</sup>  
N<sub>1</sub>\*, or N<sub>2</sub>\*, sodium nitrate supplying 48 or 96 kg N ha<sup>-1</sup>

**PKNaMgSi**, applied in winter.

P 35kg P ha<sup>-1</sup> as powdered (recently granular) superphosphate  
K 225 kg K ha<sup>-1</sup> as potassium sulphate (50% K<sub>2</sub>O)  
Na 15 kg Na ha<sup>-1</sup> as sodium sulphate (14% Na)  
Mg 11 kg Mg ha<sup>-1</sup> as magnesium sulphate (10% Mg)  
Si 450 kg ha<sup>-1</sup> of water-soluble powdered sodium silicate to plot 11<sup>2</sup> only.

Plot 20 in years when FYM not applied  
30 kg N, 15 kg P and 45 kg K ha<sup>-1</sup>

**Organic**, applied every fourth year

FYM 35 t ha<sup>-1</sup> farm yard manure (bullocks) (1973, 1977)  
Fish meal (about 6.5% N) to supply 63 kg N ha<sup>-1</sup> (1975, 1979) (about 950 kg meal ha<sup>-1</sup>)

TABLE 1b

Plot treatments, starting dates and early treatments for all the Park Grass Plots

Plot number	Present Treatment	Starting Date	Treatment in early years where different from present
No nitrogen group			
2	Unmanured	1863	FYM 1856-62
3	Unmanured	1856	
12	Unmanured	1856	
4 <sup>1</sup>	P	1859	Sawdust 1856-58
8	PNaMg	1863	PKNaMg, + sawdust 1856-61
7	PKNaMg	1856	
15	PKNaMg	1876	N <sub>2</sub> * 1858-1875
Ammonium N group			
1	N <sub>1</sub>	1864	N <sub>1</sub> and FYM 1856-63
4 <sup>2</sup>	N <sub>2</sub> P	1859	Sawdust 1856-58
10	N <sub>2</sub> PNaMg	1863	N <sub>2</sub> PKNaMg 1856-61 Sawdust 1856-62
18	N <sub>2</sub> KNaMg	1905	NPKNaMgSi 1865-1905
9	N <sub>2</sub> PKNaMg	1856	
11 <sup>1</sup>	N <sub>3</sub> PKNaMg	1882	N <sub>4</sub> PKNaMg 1856-81 except 1859-61 N <sub>2</sub> PKNaMg
11 <sup>2</sup>	N <sub>3</sub> PKNaMgSi	1882	
Nitrate - N group			
17	N <sub>1</sub> *	1858	
16	N <sub>1</sub> *PKNaMg	1858	P omitted 1866 and 1867
14	N <sub>2</sub> *PKNaMg	1858	
Organic			
13	FYM + fish meal	1905	N <sub>2</sub> PKNaMg 1856-1904 and straw until 1897
19	FYM	1905	N <sub>1</sub> PK 1872-1904
20	FYM + NPK	1905	N <sub>1</sub> PK 1872-1904

18R

TABLE 2

Details of liming on Park Grass plots

(1) Old (Main) liming scheme, started 1903

Southern halves of all plots 1-13 (except 5/1, 5/2, 6 and 12) and 16 received 2.24 t CaO ha<sup>-1</sup> as ground lime in 1903, 1907 and 1915 and every fourth year between 1920 and 1964. Plots 14, 15 and 17 came into this scheme in 1920.

(2) Scheme to test two laboratory methods for estimating lime requirement of soils, started 1920

Plots 18, 19 and 20 divided into 3 in 1920. One third received no lime, another third, light and the other heavy rate of liming every fourth year since then.

Rates in t CaO ha<sup>-1</sup> are

Plot	Light	Heavy
18	4.43	7.61
19	0.64	3.53
20	0.64	3.11

(3) New liming scheme, started 1965

Eventual aim is to have pHs 7, 6, 5 and 4 for 4 sub plots (*a*, *b*, *c* and *d*) within each plot. Limed half-plot split into *a* and *b* and unlimed into *c* and *d*.

(a) First phase 1965-1968

Ground chalk applied to some of the *b* and *c* sub-plots receiving ammonium sulphate. Amounts in t ha<sup>-1</sup> as follows.

Plot	sub-plot	
	<i>b</i>	<i>c</i>
1	—	12.4
4 <sup>2</sup>	3.7	22.4
9	7.5	17.6
10	3.7	20.0
11 <sup>1</sup>	24.9	20.0
11 <sup>2</sup>	15.1	20.0
13	—	3.7
18	—	10.0

pH of sub-plot *a* maintained at 1965 pH level by liming every fourth year; no lime applied to sub-plot *d*.

(b) Second phase, starting 1976

Lime applied to raise pH of all *a* sub-plots to 7 where they start less than thi

19L



TABLE 3

The pHs of all sub-plots on Park Grass during 1974-77 (supplied by A.E. Johnston)

Plot	a <sup>(1)</sup>	b	c	d <sup>(2)</sup>
1	6.6	5.9 <sup>(3)</sup>	4.3 <sup>(4)</sup>	4.1
2	7.1	6.7 <sup>(3)</sup>	5.2 <sup>(3)</sup>	5.2
3	7.1	6.5 <sup>(3)</sup>	5.1 <sup>(3)</sup>	5.3
4/1	6.9	6.6 <sup>(3)</sup>	5.4 <sup>(3)</sup>	5.3
4/2	5.8	5.9 <sup>(4)</sup>	4.0 <sup>(4)</sup>	3.9
6	6.3	6.5 <sup>(3)</sup>		
7	6.6	6.3 <sup>(3)</sup>	5.2 <sup>(3)</sup>	4.8
8	6.9	6.8 <sup>(3)</sup>	5.2 <sup>(3)</sup>	5.2
9	5.0	5.6 <sup>(4)</sup>	4.2 <sup>(4)</sup>	3.9
10	5.5	5.8 <sup>(4)</sup>	4.2 <sup>(4)</sup>	3.9
11 <sup>1</sup>	4.3	4.4 <sup>(4)</sup>	4.4 <sup>(4)</sup>	3.7
11 <sup>2</sup>	5.1	5.5 <sup>(4)</sup>	4.2 <sup>(4)</sup>	3.8
12	5.3	6.0 <sup>(3)</sup>	5.2 <sup>(3)</sup>	5.2
13	6.9	6.2 <sup>(3)</sup>	5.0 <sup>(4)</sup>	4.9
14	7.0	6.7 <sup>(3)</sup>	5.8 <sup>(3)</sup>	5.8
15	6.3	6.5 <sup>(3)</sup>	5.0 <sup>(3)</sup>	4.7
16	6.8	6.5 <sup>(3)</sup>	5.3 <sup>(3)</sup>	5.2
17	7.2	7.0 <sup>(3)</sup>	5.6 <sup>(3)</sup>	5.9
18	6.8	6.7 <sup>(3)</sup>	4.4 <sup>(3)</sup>	3.9 18/2 7.6 <sup>(3)</sup>
	Unlimed	Low Lime		High Lime
19	5.3 <sup>(3)</sup>	6.1 <sup>(3)</sup>		6.7 <sup>(3)</sup>
20	5.5 <sup>(3)</sup>	6.0 <sup>(3)</sup>		6.9 <sup>(3)</sup>

- (1) Sampled in 1975 (all *a* sub-plots) (2) Sampled in 1976 (all *d* sub-plots)  
 (3) Sampled in 1977 (4) Sampled in 1974

S



**TABLE 5** Relationship between abundance scores (F<sup>o</sup>-F<sup>++</sup>) of visual surveys and the % contribution of species to yield estimated by botanical analysis of hay samples

Abundance Score	Year						
	1947		1948		1949		
	Range	Mean	Range	Mean	Range	Mean	
All species	F <sup>o</sup>	t - 69	6	t - 20	3	t - 22	5
	F	t - 81	8	t - 54	4	t - 82	4
	F <sup>+</sup>	2 - 21	8	s - 45	9	t - 99	15
	F <sup>++</sup>	s - 52	21	6 - 91	23	5 - 57	14
Grasses	F <sup>o</sup>	s - 69	11	t - 16	4	1 - 22	7
	F	s - 81	14	t - 54	6	t - 82	6
	F <sup>+</sup>	4 - 21	9	s - 45	15	4 - 99	29
	F <sup>++</sup>	14 - 52	33	6 - 91	32	57	57
Legumes	F <sup>o</sup>	t - t	t	t - 13	2	1 - 12	6
	F	s - 7	3	t - 16	3	2 - 10	5
	F <sup>+</sup>	4 - 7	6	2 - 11	5	2 - 13	6
	F <sup>++</sup>	6 - 11	8	6 - 6	6	5 - 5	5
Others	F <sup>o</sup>	1 - 6	2	t - 20	2	t - 8	2
	F	t - 13	3	t - 13	1	t - 10	1
	F <sup>+</sup>	2 - 8	5	t - 13	5	t - 10	4
	F <sup>++</sup>	s - 10	5	6 - 15	10	7 - 14	10

t = trace, 0.1% or less, s = small amount, 0.2-0.5%. In 1947 visual survey preceded the hay harvest by 3 days and in 1948 and 1949 by about 13 days.

**TABLE 6** Comparison of number of species detected by visual surveys and hay analyses in 1947, 1948 and 1949. (mean of all plots analysed)

	Visual survey	Hay analyses	Hay analyses + O.S.
1947	13	21	25
1948	14	23	28
1949	14	21	27

O.S. = odd species whose presence was noted during analysis of hay but whose contribution was too small to be quantified.

214



## Notes on Tables 7-45

The following tables give details of the botanical composition of all Park Grass plots throughout the duration of the experiment. They have been compiled from data in Lawes & Gilbert (1859), Lawes, Gilbert & Masters (1882), Brenchley and Warington (1958), Rothamsted Annual Reports until 1939, Numerical Results of the Field Experiments at Rothamsted since then and the present (1973-76) analyses. However, to minimise errors in reproduction, reference has also been made to original papers where possible and the tables include results for some years not previously published.

The data are necessarily condensed both to reduce the bulk of the tables, and also since it is questionable whether the accuracy of the sampling method justifies presentation of minor components to many decimal places. The tables were assembled primarily to enable the major changes with time in botanical composition within plots to be traced for the present paper but should also serve as a source of information for future reference. In the tables of complete analyses the species are listed in alphabetical order within three main groups, grasses, legumes (where they occur) and other species and the following abbreviations are used throughout: t = trace, 0.1% or less; s = small amount 0.2-0.5% inclusive. Care should be taken in interpreting differences between species which are evidently minor constituents of the herbage: little emphasis should be placed on a difference in one category in one season and it should be borne in mind that at this level the difference within a category may sometimes be larger than between categories. It is important therefore that comparisons of minor components should take account of the data for a number of years. Only species which have contributed at least 0.5% on at least one occasion are included in the tables so that the number of species listed should not be taken as an absolute measure of the number occurring on a plot.

Tables 38-45 give details of the botanical composition of plots analysed during 1973-76. To maintain continuity with the past records results are given to one decimal place but contributions of less than 0.05% are denoted by t. Because results were originally calculated to three decimal places, the totals shown may not agree exactly with the sums of individual species. Since the plots differ greatly in total yield the results are also presented as amounts of the different species per unit area of land.

TABLE 7a Percentage Grasses (G), Legumes (L) and Other Species (O) on the Park Grass Plots

Plot Treatment	Plots not receiving nitrogen																																							
	1858 '62	'67	'71	'72	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	1902 '03	'04	'05	'06	'07	'08	'09	'10	'11	'12				
U	G	76	71	66	79	69	73	69	66	71	67	70	64	79	71	78	73	72	68	56	65	73	51	53	48	47	57	34	52	42	39	46	52	56	65	67	46	41		
	L	5	8	5	9	10	12	9	15	10	4	3	8	4	10	12	20	15	13	12	3	9	3	3	9	6	7	8	13	9	8	6	13	6	3	4	5			
	O	16	21	29	16	22	17	19	22	20	18	20	32	19	21	19	17	16	13	28	31	23	24	40	44	48	44	37	58	40	45	52	46	42	32	29	30	50	54	
3 - U	G	59	54	53	66	44	45	47	52	73	60	63	47	61	50	71	54	34	48	66	58	47	45	57	29	38	53	47	48	54	61	53	46	53	53	64	61			
	L	9	6	5	9	5	6	5	10	5	5	8	5	6	2	7	9	10	7	3	5	10	10	8	4	7	10	12	8	8	5	12	14	11	7	7	4			
	O	32	36	42	25	50	49	48	38	22	35	31	40	34	44	26	40	59	43	29	27	39	37	43	45	35	67	55	37	41	44	37	34	35	40	36	40	29	35	
L	G	59	63	53	59	60	68	51	63	49	73	62	62	64	43	54	59	73	56	53	52	47	55	37	39	50	47	52	41	28	27	21	20	21	15	16	12	10		
	L	8	8	11	5	12	10	8	11	14	5	8	4	7	19	17	12	7	14	6	11	16	15	10	18	23	18	11	13	17	21	21	15	16	12	10	10			
	O	33	27	36	35	28	21	41	25	33	21	30	33	28	38	29	29	20	30	41	37	37	30	53	43	27	35	37	46	54	51	52	45	48	45	48	45	59		
U	G	72	63	80	72	74	81	83	81	84	87	76	82	80	78	68	69	66	64	64	73	72	60	61	65	65	29	43												
	L	19	9	3	8	7	5	5	4	5	3	2	1	5	2	7	7	6	10	11	3	3	5	4	6	8	5	22	19											
	O	9	28	17	20	21	14	11	15	11	11	15	11	22	17	15	20	24	27	26	25	23	25	35	29	28	18	49	38											
8 PNaMg U	G	50	35	35	45	44	45	50	51	30	30	63	53	69	48	38	46	49	56	44	57	34	46	42	47	40	47	35	32	27	51	53	56							
	L	11	11	12	15	20	13	9	5	16	11	11	8	3	6	10	17	11	25	15	14	25	12	7	14	17	17	17	16	9	7	9								
	O	39	53	53	40	36	41	46	40	36	41	26	36	23	49	56	42	54	33	31	28	55	40	32	41	53	39	48	51	57	40	40	35							
L	G	53	40	45	51	51	49	64	38	41	63	68	51	71	59	55	57	63	59	69	54	56	55	59	65	48	47	33	33	60	53	64								
	L	19	17	17	20	17	5	9	8	14	9	22	8	5	6	8	14	9	18	14	7	15	24	14	10	20	20	24	24	10	11	10								
	O	28	41	38	32	29	34	31	53	51	23	21	27	21	37	39	33	29	28	23	17	39	29	21	27	25	32	33	43	30	36	26								
U	G	72	65	59	72	46	74	83	81	74	75	80	72	86	69	76	61	52	53	64	59	54	58	52	56	45	37	71	20	42	62	49	48	53	56	52	71	65	46	
	L	23	25	13	16	40	13	9	10	14	14	8	7	5	20	7	31	37	35	23	19	26	20	31	22	45	58	16	55	33	18	23	22	29	29	30	10	10	19	
	O	2	11	28	12	11	13	8	9	12	11	11	20	9	10	17	8	10	11	13	21	20	22	17	21	10	6	12	24	25	20	28	30	17	15	18	19	19	24	35
L	G																																							
	L																																							
	O																																							
7 PKNaMg U cont.	G	70	68	61	75	59	57	52	43	68	69	69	47	73	73	69	59	40	43	60	71	52	47	48	44	58	48	49	67	54	38	26	29	51	47	76	73			
	L	21	17	25	15	11	11	9	28	13	13	15	33	6	6	10	21	35	19	16	30	37	38	33	21	28	40	19	28	10	19	32	40	26	17	20	11	13		
	O	8	15	14	10	30	32	39	28	18	17	16	20	21	20	21	20	25	21	21	13	18	16	15	23	21	24	15	23	23	27	30	34	45	31	33	13	14		
L	G	71	72	54	70	71	59	43	66	61	53	37	75	82	63	57	33	51	77	69	44	42	59	51	74	56	69	74	63	64	71	52	61	65	71	52	47	48	40	
	L	21	20	37	26	18	16	20	44	22	30	40	52	1	5	25	34	57	43	9	14	44	41	31	10	21	22	14	26	11	17	34	20	15	9	25	22	47		
	O	8	8	9	4	11	13	21	13	12	9	7	11	24	14	12	9	10	6	14	17	12	1	10	18	16	23	9	12	11	25	12	13	19	19	20	18	30	13	

U = Unlimited; L = Limed



TABLE 7b Percentage Grasses (G), Legumes (L), and Other Species (O) on the Park Grass Plots

		Plots receiving nitrogen as ammonium sulphate																											
		'1858	'62	'67	'71	'72	'75	'77	'78	'79	'80	'81	'82	1902	'14	'19	'39	'40	'41	'42	'43	'44	'45	'46	'47	'48	'73		
U	G	80	89	86	91	82	87	84	89	95	85	94	92	78	78	86	95	98	96	97	99	97	95	98	93	95	98		
	L	2	s	1	s	s	1	s	s	1	s	s	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-		
	O	16	11	13	9	17	13	15	10	5	15	6	5	21	21	14	5	2	4	3	1	3	5	2	7	5	2		
1 N <sub>1</sub>	G																												
	L																												
	O																												
4 <sup>2</sup> N <sub>2</sub> P	G																												
	L																												
	O																												
U	G	55	81	84	81	61	93	86	69	87	91	80	96	91	87	78	98	96	79	96	96	98	99	99	100	100	100		
	L	3	2	3	8	t	s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	O	39	16	14	16	31	7	14	31	12	9	19	3	8	13	22	2	4	21	4	4	2	1	s	s	s	-		
LL	G																												
	L																												
	O																												
HL	G																												
	L																												
	O																												

U = unlimed, L = limed, LL = low lime, HL = high lime (see Table 2)









TABLE 8 Botanical Composition (% contribution to hay weight) of PLOT 3, UNMANURED, UNLIMITED

	Year																						
	1858	'62	'67	'72	'77	1903	'14	'19	'21	'22	'23	'24	'25	'26	'36	'37	'38	'39	'40	'47	'48	'75	'76
Agrostis	7	11	9	16	13	s	13	8	25	24	21	19	19	18	14	12	6	8	12	8	16	15	23
Alopecurus		4	6	s	s	1	s	s	1	3	s	5	1	2	1	2	1	2	3	2	8	2	s
Anthoxanthum	5	4	9	5	5	1	3	7	4	1	4	4	7	3	3	10	3	2	3	5	1	7	2
Arrhenatherum	6	t	s	t	t	t	t	s	s	s	t	t	s	t	t	t	t	t	1	1	t	s	t
Briza	2	2	1	6	7	20	4	2	1	1	5	s	2	1	3	3	1	3	1	5	s	1	1
Cynosurus	1	s	t	1	1	s	t	s	s	t	t	s	t	s	t	t	t	t	s				
Dactylis	2	2	2	1	1	1	4	8	12	8	4	4	7	5	3	5	3	3	3	12	4	2	1
Festuca rubra	8	13	15	22	22	17	25	7	13	13	20	11	11	7	13	14	8	11	19	10	17	33	32
Helictotrichon		10	3	3	3	5	4	4	3	3	4	4	6	4	5	4	5	5	6	3	3	s	s
Holcus	17	5	8	4	12	5	3	9	11	3	4	2	8	7	2	5	1	3	5	5	4	1	1
Lolium	17	6	4	2	4	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t
Poa trivialis		1	1	s	1	t	1	1	1	2	1	s	s	1	1	s	s	s	s	1	s	t	t
Trisetum		2	2	3	1	1	1	1	1	2	1	1	s	1	1	s	s	s	s	1	s	t	t
Lathyrus	2	1	1	1	2	2	s	1	1	1	1	2	2	1	1	1	1	1	1	3	s	s	s
Lotus	2	2	2	6	4	4	3	2	3	3	3	4	2	3	7	5	2	4	6	3	4	2	1
Trifolium pratense	1	4	2	2	2	1	2	2	s	s	1	1	1	1	2	1	1	2	2	5	2	3	2
Achillea	1	1	1	2	2	3	1	2	1	1	1	2	1	1	2	1	1	1	2	1	1	1	1
Carex		s	1	1	s	1	1	s	1	1	2	2	1	1	s	1	1	s	2	1	1	1	1
Centaurea		s	1	2	1	4	9	6	4	7	2	10	3	3	3	2	4	3	1	1	1	1	1
Cerastium		s	s	1	1	1	s	1	t	s	s	s	s	t	s	t	t	s	t	1	s	s	t
Conopodium		1	3	3	2	1	s	5	s	2	2	2	2	3	2	2	1	2	2	6	2	s	s
Knautia							s	s	s	s	2	2	3	5	4	5	s	1	s	1	1	s	s
Leontodon		t	1	1	1	6	18	7	2	4	3	6	3	5	14	2	17	18	12	12	18	10	14
Luzula	t	2	4	3	2	s	s	t	s	s	3	s	s	t	1	1	1	t	s	1	s	1	1
Pimpinella		1	3	1	1	s	1	1	t	s	s	1	s	1	1	s	s	s	s	t	t	s	1
Plantago	11	7	11	3	3	2	3	19	8	11	11	11	15	17	6	9	24	12	6	4	6	6	7
Poterium		s	s	1	1	14	2	6	4	5	4	5	4	6	9	8	18	15	9	5	6	7	6
Ranunculus	s	5	2	3	3	2	s	s	t	t	t	t	t	t	t	s	1	t	t	1	t	1	s
Rumex	1	1	2	2	2	2	s	2	1	1	1	1	1	2	s	1	t	1	s	4	2	1	s
Veronica		s	s	t	s	1	t	t	t	t	s	s	s	s	s	s	t	t	s	t	t	t	t



TABLE 9 Botanical Composition (%) of PLOT 2, UNMANURED

	UNLIMED						LIMED					
	1862	'67	'72	'77	1914	'49	1914	'19	'49			
Agrostis	3	5	11	18	8	10	2	s	s			
Alopecurus	3	2	6	3	2	1	2	1	4			
Anthoxanthum	s	3	7	7	4	9	1	2	s			
Arrhenatherum	2	s	s	t	s	1	s	s	s			
Briza		t	s	1	6	3	3	2	4			
Bromus	18	16	4	s								
Cynosurus	t	s	1	1	s	1	t	t				
Dactylis	4	6	3	3	4	11	5	15	7			
Festuca rubra	s	5	10	11	26	5	24	5	7			
Helictotrichon	3	4	10	8	5	3	18	20	22			
Holcus	2	11	7	11	4	11	5	9	2			
Lolium	1	4	3	5	s	s	t	2	1			
Poa pratensis	2	4	2	1	s	s	1	2	1			
Poa trivialis	28	16	3	2			t	s	s			
Trisetum	6	6	12	3	1	1	2	4	1			
Lathyrus	1	1	4	5	1	1	2	2	2			
Lotus		t	s	s	4	3	9	2	10			
Trifolium pratense	s	s	s	1	1	1	3	1	5			
Trifolium repens	1	1	s	s	t	s	t	t	1			
Achillea	2	1	3	2	1	1	1	1	1			
Centaurea	t	1	1	1	7	5	8	4	2			
Cerastium	t	t	1	s	s	1	1	1	s			
Conopodium	3	3	1	1	s	4	t	1	s			
Galium					s	s	t	s	2			
Knautia		t	t	t	s	t	t	s	2			
Leontodon		t	t	t	16	3	12	8	9			
Linum							t	t	s			
Luzula	t	s	s	1	s	t	s	t	s			
Pimpinella	s	s	s	s	1	t	1	1	s			
Plantago	2	3	1	4	5	21	6	8	15			
Ranunculus	3	1	1	4	s	s	1	1	4			
Rumex	12	3	2	2	s	1	1	s	3			
Veronica	s	2	1	1	t	t	t	t	s			

This plot received farmyard manure during 1856-63

TABLE 10 Botanical Composition (%) of PLOT 12, UNMANURED, UNLIMED

	UNLIMED					
	1862	'67	'72	'77	1914	'49
Agrostis	9	5	11	13	8	3
Alopecurus	3	3	3	1	1	8
Anthoxanthum	4	8	7	5	3	3
Arrhenatherum	1	1	2	1	1	1
Briza	1	2	4	4	10	6
Dactylis	3	3	2	3	4	9
Festuca pratensis	10	4	2	3		2
Festuca rubra	7	12	16	21	33	19
Helictotrichon	10	6	5	3	2	4
Holcus	5	6	4	10	3	3
Lolium	4	3	2	2	t	t
Poa pratensis	1	1	1	s	s	s
Poa trivialis	3	2	1	1	t	s
Trisetum	2	2	2	s	1	s
Lathyrus	2	2	2	2	1	1
Lotus	2	4	5	3	4	7
Trifolium pratense	2	3	2	2	2	5
Trifolium repens	s	2	1	t	t	s
Achillea	1	1	4	3	1	2
Carex	s	1	1	1	2	s
Centaurea	1	t	3	2	5	2
Cerastium	s	1	3	1	s	t
Conopodium	2	5	2	3	s	1
Knautia	t	t	t	t	s	1
Leontodon	t	t	t	t	6	10
Luzula	1	3	3	1	s	1
Plantago	8	8	s	1	5	7
Ranunculus	3	2	3	6	t	1
Rumex	3	4	3	2	s	1

This plot, unlike all others, was not split for liming

TABLE 11 Botanical Composition (%) of PLOT 3, UNMANURED, LIMED

	Year																
	1914	'19	'21	'22	'23	'24	'25	'26	'36	'37	'38	'39	'40	'47	'48	'75	'76
Agrostis	3	1	2	4	3	3	2	2	3	1	s	1	2	1	1	2	2
Alopecurus	1	1	5	3	7	9	4	3	2	5	1	3	7	3	6	1	1
Anthoxanthum	1	3	1	s	1	s	s	s	s	1	s	s	1	3	1	6	2
Arrhenatherum	s	s	s	1	t	t	s	s	s	s	s	s	1	t	t	s	s
Briza	10	9	8	5	7	2	10	11	5	5	2	5	1	4	1	2	2
Dactylis	3	7	8	8	3	4	6	8	3	4	4	3	4	3	3	2	2
Festuca rubra	23	5	13	10	18	9	8	6	7	8	2	5	8	3	4	14	12
Helictotrichon	14	19	18	11	18	17	32	19	12	16	20	16	18	13	13	8	5
Holcus	4	8	9	2	3	2	5	6	3	5	2	2	3	5	2	4	2
Poa pratensis	2	2	1	2	2	2	3	2	4	3	1	1	2	2	2	1	1
Poa trivialis	t	t	t	t	t	t	t	s	1	3	s	s	1	1	s	s	t
Trisetum	1	3	3	4	2	2	2	3	5	3	2	2	2	2	1	1	1
Lathyrus	3	1	2	3	2	6	2	2	1	1	1	2	2	2	2	2	1
Lotus	3	2	7	3	5	5	2	4	10	10	4	11	14	5	7	3	4
Trifolium pratense	2	2	1	1	3	3	1	1	5	4	4	5	7	7	6	7	5
Trifolium repens			t	s	s	s	t	t	s	s	s	s	s	s	1	s	t
Achillea	1	2	1	1	1	2	1	1	1	s	s	1	1	s	1	1	1
Carex	1	s	s	s	1	1	s	s	t	t	t	t	t	t	1	3	1
Centaurea	11	6	5	21	4	9	3	4	3	1	1	1	s	s	2	1	1
Cerastium	1	1	t	s	1	s	s	s	s	s	t	s	t	s	s	s	s
Conopodium	t	1	t	s	s	s	1	s	s	s	s	s	t	1	t	s	t
Knautia	1	2	1	2	1	6	2	3	10	7	3	4	4	2	2	s	1
Leontodon	4	1	1	1	2	1	s	2	4	2	12	9	7	9	12	12	19
Luzula	s	s	t	t	1	1	t	s	s	1	s	s	1	s	s	2	1
Pimpinella	1	t	s	s	1	1	1	1	1	s	s	1	1	s	s	s	1
Plantago	4	12	9	8	7	5	7	9	5	6	17	8	5	6	13	10	15
Poterium	3	3	2	4	3	4	2	4	9	5	13	13	4	13	12	12	17
Ranunculus	1	3	s	s	1	2	2	2	1	4	5	3	2	9	3	2	1
Rumex	1	4	1	1	s	1	1	4	1	s	2	1	s	2	1	t	t
Veronica	t	t	t	t	s	t	s	t	1	1	t	s	1	s	s	t	t

TABLE 12 Botanical Composition (%) of PLOT 4<sup>1</sup>, P

	Year									
	UNLIMITED					LIMITED				
1862	'67	'72	'77	1903	'14	'19	'49	1914	'19	'49
Agrostis	7	6	14	10	t	1	1	2	2	s
Alopecurus	1	2	1	1	s	t	t	2	1	2
Anthoxanthum	4	7	5	5	2	4	3	1	2	1
Arrhenatherum	t	s	t	t	t	s	1	t	t	t
Briza	1	s	2	2	11	2	1	3	3	2
Dactylis	2	1	1	1	1	5	11	2	6	5
Festuca rubra	10	17	20	16	9	22	5	9	23	4
Helictotrichon	9	5	4	4	10	10	14	5	13	18
Holcus	12	9	5	19	5	9	10	7	20	7
Lolium	9	5	3	4	t	t	s	s	7	4
Poa pratensis	1	s	s	1	1	1	1	1	2	2
Poa trivialis	5	6	4	5	1	1	1	s	2	2
Trisetum	4	4	6	2	3	2	3	1	4	3
Lathyrus	s	1	4	3	5	2	2	11	5	7
Lotus	s	1	4	1	7	1	1	2	4	8
Ononis			t	1		s	s			
Trifolium pratense	1	s	t	s	3	3	t	5	1	5
Trifolium repens	1	t	s	s	3	1	t	s	2	2
Achillea	1	2	5	3	2	2	2	1	2	3
Centaurea	s	1	1	1	5	9	8	2	6	3
Cerastium	s	1	1	1	1	1	1	1	s	3
Conopodium	1	2	1	1	s		s	1	s	
Knautia			t		s	s		1	1	2
Leontodon	1	1	t	1	15	13		11	2	6
Luzula	1	2	4	1	1	s	s	1	2	6
Pimpinella	1	3	1	1	s			s	s	s
Plantago	6	10	3	4	2	7	18	4	11	10
Poterium	t	1	t	s	8	1	1	t	t	2
Ranunculus	6	1	4	6	1	s	2	1	5	2
Rumex	4	5	3	3	1	1	10	1	6	2

P has been applied since 1859, Sawdust between 1856-58

TABLE 13 Botanical Composition (%) of PLOT 7, PK Na Mg, UNLIMITED

	Year																						
	1858	'62	'67	'72	'77	1903	'14	'19	'21	'22	'23	'24	'25	'35	'36	'37	'38	'39	'40	'47	'48	'75	'76
Agrostis	11	7	6	12	12	3	7	5	12	19	15	14	11	8	6	12	7	7	3	5	4	29	31
Alopecurus		1	1	1	1	4	2	2	1	1	2	2	1	3	1	1	5	1	6	4	8	7	3
Anthoxanthum	1	3	4	3	3	1	4	4	5	2	4	1	2	2	4	5	1	1	3	7	4	11	5
Arrhenatherum	9	2	t	s	1	1	1	3	1	1	1	2	5	s	2	3	5	1	3	4	2	s	1
Briza	1	t	t	t	t	t	2	t	t	t	t	t	t	t	t	t	t	t	s		s	t	
Bromus		1	1	1	1	1	2	2	1	1	10	12	34	6	13	16	23	22	26	21	16	5	3
Dactylis	3	5	2	4	4	5	10	22	14	12	10	12	34	6	13	16	23	22	26	21	16	5	3
Festuca pratensis	s	1	t	1	1	s	s																
Festuca rubra	6	14	11	15	27	8	32	7	18	24	28	11	9	20	10	7	2	8	6	4	5	15	23
Helictotrichon	14	4	2	2	2	4	3	3	3	2	3	1	1	2	2	1	1	2	2	1	1	t	s
Holcus	12	5	12	3	13	3	3	4	12	4	2	1	6	3	4	10	3	1	6	2	3	7	6
Lolium	23	3	2	1	3	t	s	t	t	t	t	t	t	t	t	t	t	t	2	2	3	7	s
Poa pratensis	1	1	1	2	2	2	1	1	1	2	2	2	1	1	2	1	1	1	2	2	3	1	1
Poa trivialis	4	4	2	2	2	1	s	s	t	t	t	t	t	t	t	s	t		s	s	s	s	s
Trisetum	4	4	5	4	4	7	2	1	2	2	1	1	1	s	1	1	1	s	1	1	1	1	s
Lathyrus	4	13	7	37	12	22	11	7	8	12	9	29	6	31	16	11	11	29	9	11	11	5	7
Lotus	s	1	1	s	t	s	1	s	1	1	1	1	t	3	5	2	2	2	3	s	s	t	1
Trifolium pratense	18	7	5	1	2	6	5	1	3	s	6	3	s	3	10	7	14	5	5	4	5	4	5
Trifolium repens	3	3	s	2	t	4	1	1	1	t	s	s	t	1	s	s	s	4	3	2	3	1	s
Achillea	s	2	3	5	1	9	2	6	4	2	1	3	2	2	3	1	2	3	1	8	14	1	1
Centaurea	t	1	1	s	t	1	7	2	3	6	1	s	2	5	8	2	8	4	3	7	4	2	1
Cerastium	t	t	t	t	t	s	s	t	3	3		t											
Conopodium	2	9	1	2	2	2	1	9	1	1	2	3	3	s	2	3	s	1	2	4	1	1	2
Heracleum	2	s	t	1	2	2	s	4	1	3	2	3	4	2	4	4	2	1	5	1	1	s	t
Luzula	1	1	1	2	s	s	s	s	s	s	1	s	s	1	s	s	t	s	1	t	s	1	1
Pimpinella	1	1	1	s	s	s	s	s	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t
Plantago	s	1	1	t	t	t	1	1	1	2	4	4	3	3	3	2	3	2	1	5	7	7	7
Ranunculus	1	s	s	s	s	3	1	2	s	t	1	1	1	s	s	1	1	1	1	1	1	s	t
Rumex	1	2	9	1	7	4	s	11	2	2	2	3	4	1	2	7	5	1	6	2	2	s	s
Spiraea						1	1	2	3	1	2	1	1	t	1	1	3	1	2	t	s	s	1
Taraxacum	s	s	t	1	s	1			t	t	t	t	t	t	t	t	t	t	t	t	t	s	1
Veronica						1			t	t	t	t	t	t	t	t	t	t	t	t	t	s	1

TABLE 14 Botanical Composition (%) of PLOT 7, PK Na Mg, LIMED

	Year															
	'19	'21	'22	'23	'24	'25	'35	'36	'37	'38	'39	'40	'47	'48	'75	
Agrostis	4	2	5	5	1	2	1	8	8	17	11	16	23	16	13	5
Alopecurus	10	15	12	11	7	10	9	11	8	17	11	16	23	16	13	5
Anthoxanthum	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Arrhenatherum	2	3	5	4	3	4	27	6	6	17	17	11	11	19	12	31
Bromus	16	1	3	5	8	1	3	1	1	1	2	7	7	2	1	1
Dactylis	12	19	12	10	5	10	23	11	17	22	19	14	21	21	13	3
Festuca rubra	13	5	10	13	10	2	3	5	3	2	1	3	1	1	1	1
Helictotrichon	4	9	12	5	6	5	8	9	4	3	2	6	3	4	5	5
Holcus	2	2	2	2	1	1	1	1	2	1	1	1	1	1	1	2
Poa pratensis	1	2	2	3	3	2	1	4	2	1	1	1	1	1	1	1
Poa trivialis	2	1	1	1	1	1	1	4	9	12	1	6	9	2	1	1
Trisetum	4	1	1	2	2	2	2	3	3	3	1	2	2	2	2	1
Lathyrus	16	20	21	29	37	51	1	24	16	2	8	13	6	5	16	14
Lotus	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t
Trifolium pratense	3	t	t	s	1	t	t	2	4	4	8	1	2	t	s	8
Trifolium repens	1	1	1	t	3	t	6	11	4	4	4	8	6	4	6	s
Achillea	1	1	s	s	s	1	1	1	1	s	s	s	t	s	1	t
Anthriscus			s	s	1	1	1	1	1	t	s	s	t	s	1	1
Centaurea	3	1	1	1	1	1	1	1	4	t	3	1	t	1	s	1
Conopodium	s	4	1	1	1	1	1	s	t	s	t	s	t	t	t	t
Heraclium	s	2	5	2	1	5	12	3	6	4	5	1	4	5	4	7
Knautia	1	1	1	1	1	s	t	t	1	1	1	1	2	1	1	1
Plantago	s	1	1	1	1	s	s	1	1	1	1	1	1	2	1	1
Ranunculus	1	4	1	1	1	1	2	1	1	3	3	1	1	3	2	8
Rumex	s	7	s	t	s	1	5	1	1	4	3	1	1	3	s	2
Taraxacum	t	t	1	1	1	1	1	1	1	4	8	2	3	2	2	9
Tragopogon	s	2	1	2	s	s	t	2	t	1	1	1	t	3	3	3



TABLE 15 Botanical Composition (%) of PLOT 15, P K Na Mg

	Year															
	1862	'67	'72	'77	1903	'14	'19	'21	'23	'25	'27	'29	'31	'33	'33	'49
	UNLIMED															
Agrostis	8	7	8	13	3	12	11	15	13	17	12	12	20	17	3	9
Alopecurus	7	6	2	7	10	14	30	8	8	10	9	9	18	11	19	20
Anthoxanthum	22	2	4	4	2	3	3	3	4	3	4	1	5	8	2	2
Arrhenatherum	t				s	1	3	1	1	1	9	1	6	11	1	3
Bromus	2	6	4	2	3	3	t	t	t	t	t	t	t	s	1	1
Dactylis	2	s	t	s	s	2	5	5	3	10	16	6	7	12	8	2
Festuca rubra	14	12	35	21	15	14	7	22	21	8	8	17	11	9	7	20
Helictotrichon	3	1	2	3	4	2	2	3	2	2	3	3	3	4	1	3
Holcus	8	12	5	15	2	6	6	11	2	10	12	2	7	4	1	5
Poa pratensis	t	t	s	t	2	s	1	1	1	1	1	1	1	1	s	2
Poa trivialis	6	24	8	6	1	s	s	t	t	t	t	t	t	t	t	1
Lolium	7	3	4	7	t	s	t									1
Trisetum	4	4	4	3	5	2	1	2	1	1	1	1	1	1	s	2
Lathyrus	t				16	28	5	8	15	4	5	16	5	8	22	18
Trifolium pratense	s	t	t	s	6	s	t	t	t	1	1	3	t	s	2	t
Trifolium repens	t	t	t	t	7	2	t	s	s	t	s	3	3	1	3	5
Achillea	2	1	3	1	10	4	5	3	2	7	6	16	8	1	10	2
Centaurea	s	3	1	1	1	1	1	1	s	1	s	1	t	s	8	t
Cerastium	1	4	9	1	1	s	4	1	1	3	2	1	1	1	1	2
Conopodium	1	s	s	1	1	s	4	1	2	3	2	1	s	1	1	2
Galium	1	1	1	s	1	s	1	t	t	t	s	s	t	t	t	2
Luzula	t	s	s	s	1	s	s	1	4	s	s	s	s	1	1	4
Plantago	7	5	s	1	s	s	4	7	13	15	6	6	2	4	10	4
Ranunculus	2	s	s	s	6	1	3	s	1	3	1	1	t	s	s	1
Rumex	7	7	2	6	2	s	7	1	2	3	1	s	s	2	1	1
Taraxacum	1	t	t	t	t	s	1	t	1	s	1	1	s	s	s	1

LIMED

This plot has received PK Na Mg since 1876, between 1858 and 1875 96 kg N ha<sup>-1</sup> was applied as sodium nitrate annually

TABLE 16 Botanical Composition (%) of PLOT 8, P Na Mg, UNLIMITED

	Year																
	1862	'67	'72	'77	1903	'14	'19	'35	'36	'37	'38	'39	'40	'41	'47	'48	'75
Agrostis	10	4	9	12	1	8	4	9	7	4	3	6	4	2	4	3	5
Alopecurus	s	1	s	1	s	s	1	1	s	s	s	s	s	1	s	1	3
Anthoxanthum	4	7	8	8	1	4	5	3	3	7	2	1	2	3	6	2	10
Arrhenatherum	4	3	4	3	4	3	8	7	8	10	15	11	5	5	12	14	2
Briza	t	t	1	1	6	1	s	s	s	s	s	s	t	s	s	t	t
Dactylis	3	1	1	1	1	4	4	3	3	1	3	4	4	3	11	13	2
Festuca rubra	7	18	24	20	9	25	7	18	12	10	3	9	12	24	5	5	16
Festuca pratensis	2	s	s	s	t	-	-	-	-	-	s	t	t	-	-	-	-
Helictotrichon	13	3	4	2	8	5	3	6	5	5	2	3	4	4	2	2	s
Holcus	4	10	5	18	6	8	11	6	3	15	2	6	8	4	6	7	17
Lolium	6	3	2	8	t	s	t	1	1	t	t	s	s	1	s	t	1
Poa pratensis	2	1	2	1	1	1	1	1	s	1	s	1	1	1	1	1	s
Poa trivialis	5	3	2	3	t	s	1	s	1	1	1	1	1	s	s	t	s
Trisetum	5	3	7	2	4	2	1	2	2	2	1	2	2	1	1	1	t
Lathyrus	9	7	4	2	4	3	4	s	s	s	t	2	2	1	s	1	s
Lotus	s	1	3	1	12	2	1	4	5	4	2	4	6	3	2	3	1
Trifolium pratense	8	1	s	s	1	5	5	6	19	10	9	8	18	6	6	3	7
Trifolium repens	3	t	s	t	1	1	t	t	s	s	t	s	1	2	s	1	1
Achillea	1	5	10	3	3	3	5	4	3	1	2	4	3	6	4	7	1
Centaurea	s	s	s	1	7	9	5	3	5	2	5	4	3	2	1	2	2
Cerastium	t	t	s	s	1	1	s	s	s	t	t	s	s	1	s	t	s
Conopodium	2	7	2	1	1	1	3	t	1	1	s	1	1	1	2	1	s
Galium	t	s	s	t	s	s	t	1	1	1	s	s	s	1	s	s	1
Knautia	t	t	t	s	2	1	1	2	4	3	1	2	1	1	1	1	1
Leontodon	1	2	3	s	1	1	1	6	3	1	4	4	2	3	5	4	8
Luzula	1	2	1	1	1	t	s	1	1	1	t	s	3	2	s	s	3
Pimpinella	1	1	1	1	1	t	s	1	s	s	s	s	s	s	s	t	t
Plantago	1	1	s	s	6	9	18	13	9	10	33	13	11	19	10	15	16
Ranunculus	1	1	1	2	11	s	2	1	1	4	4	2	3	1	10	6	2
Rumex	2	8	2	6	2	s	7	1	1	3	3	7	4	2	6	3	1

Also received K 1856-61 and Sawdust 1856-62

TABLE 17 Botanical Composition (%) of PLOT 8, P Na Mg, LIMED

	Year												
	1914	'19	'35	'36	'37	'38	'39	'40	'41	'47	'48	'75	
Agrostis	5	2	2	2	1	1	1	1	1	1	1	4	
Alopecurus	1	1	3	2	2	s	1	3	1	3	3	1	
Anthoxanthum	3	1	s	1	1	s	1	1	1	6	1	13	
Arrhenatherum	4	18	14	12	26	24	12	9	8	15	6	6	
Briza	9	2	1	2	1	1	1	1	1	2	1	2	
Dactylis	3	5	5	4	7	6	5	5	5	6	6	1	
Festuca rubra	21	6	9	6	5	1	5	7	9	1	2	12	
Festuca pratensis					1	3	4	2	2	6	7	4	
Helictotrichon	9	12	15	16	11	12	16	15	20	17	11	12	
Holcus	7	5	5	2	4	2	3	4	2	4	2	6	
Lolium	t	t	t	1	1	s	s	s	t				
Poa pratensis	1	2	1	2	1	1	1	1	2	2	1	1	
Poa trivialis	1	1	2	4	4	s	1	3	3	2	1	1	
Trisetum	3	2	5	5	5	3	4	3	2	2	2	1	
Lathyrus	2	5	1	s	s	t	1	s	1	1	1	t	
Lotus	2	2	3	6	3	1	5	6	5	2	6	2	
Trifolium pratense	5	1	5	12	11	5	9	17	8	7	3	8	
Achillea	1	2	1	1	s	1	1	1	1	1	4	2	
Centaurea	9	4	5	3	2	3	5	2	3	1	2	2	
Cerastium	1	1	1	1	s	t	s	t	1	s	s	1	
Knautia	1	4	6	8	3	3	3	5	6	5	4	s	
Leontodon	s	s	4	1	t	3	3	2	1	3	6	6	
Luzula	s	s	s	s	s	t	s	1	s	s	t	2	
Pimpinella	s	t	1	s	s	s	1	s	s	s	s	s	
Plantago	5	8	8	5	5	18	11	7	10	9	13	9	
Ranunculus	1	5	s	1	3	2	1	1	1	4	2	2	
Rumex	s	8	1	s	2	7	2	1	1	3	2	s	

TABLE 18 Botanical Composition (%) of PLOT 1, N<sub>1</sub>

	Year																	
	UNLIMED							LIMED										
	1858	'62	'67	'72	'77	1914	'19	'39	'40	'47	'48	'73	1914	'19	'39	'40	'47	'48
Agrostis	1	1	6	21	23	16	18	52	24	76	75	84	12	8	4	3	1	1
Alopecurus	s	s	2	3	2	2	1	s	s	s	t	8	4	4	4	4	1	2
Anthoxanthum	1	t	1	6	14	15	17	1	1	s	s	11	7	8	2	6	6	1
Arrhenatherum	17	1	1	2	2	t	s	t	t	s	s		s	1	2	1	4	3
Bromus		22	10	4	1													
Dactylis		16	6	3	4	9	11	1	s	2	3		7	23	13	12	16	18
Festuca rubra		1	6	6	11	28	14	41	72	14	16	3	26	11	15	19	6	15
Helictotrichon		s	2	3	2	t	s			s	s		5	8	35	28	27	12
Holcus	25	4	11	14	17	7	22		t				5	10	3	3	6	6
Lolium	15	1	3	2	2													
Poa pratensis	10	1	7	7	1	1	s	s	s				4	2	2	2	1	1
Poa trivialis		32	22	4	3													
Trisetum		4	7	6	1	t							1	1	2	2	1	2
Lathyrus	1	t	1	s	s								s	s	1	2	2	2
Lotus													s	s	s	1	1	2
Achillea	2	1	3	5	1	s	s						1	2	1	2	s	2
Centaurea			s	1	s	19	2	s	1	s	1		22	4	5	1	1	2
Cerastium													1	1	s	t	s	1
Conopodium			1	2	s	1	s	1		t			s	1	t	t	s	t
Galium							s	2										
Knautia																		
Leontodon																		
Luzula			t	t	t	s	s	s	s	t	t	1						
Plantago	8	s	s	t	s					1					3	7	11	20
Potentilla		t			t					s	2	1						
Ranunculus	2	1	s	1	1	t							1	2	1	1	1	1
Rumex	3	6	6	9	10	1	10	2	1	6	2		1	11	2	3	8	2
Taraxacum															s	s	s	1

This plot also received farmyard manure during 1856-63

TABLE 19 Botanical Composition (%) of PLOT 18, N<sub>2</sub> K Na Mg, UNLIMITED

	Year													
	1914	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48	'73
Agrostis	10	17	43	51	43	48	72	63	47	75	59	75	77	83
Alopecurus	3	5	6	3	10	5	5	4	6	4	5	2	t	
Anthoxanthum	4	3	6	8	3	20	4	3	4	3	7	4	1	17
Arrhenatherum	t	2	s	1	1	t	s	1	2	2	s	s	s	
Dactylis	37	34	16	12	12	3	4	7	11	9	9		1	
Festuca rubra	38	4	14	11	9	18	5	6	3	3	6	12	9	s
Holcus	1	2	1	4	1	s	s	1	3	2	8	s		t
Poa pratensis	s	s	1	1	1	2	1	s	1	1	1			
Centaurea	4	2	2	2	9		s	2		s	t			
Conopodium	1	4	s	s	2	s	1	s	s	t	s			
Heracleum			s	s	4	s	4	1	1	s	t			
Luzula		t	t	t		t	1	s		t	t			
Rumex	1	24	9	6	4	2	2	10	21	1	3	6	11	

Received NPK Na Mg Si 1865-1904



TABLE 20 Botanical Composition (%) of PLOT 18, N<sub>2</sub> K Na Mg at two rates of lime

	Year																					
	LIGHT LIMING								HEAVY LIMING													
	'20	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48	1920	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48
Agrostis	44	41	36	28	37	36	17	22	17	2	3	35	42	31	27	26	14	11	10	5	1	1
Alopecurus	4	5	25	10	23	14	25	22	46	3	3	6	5	17	8	22	14	25	19	23	3	4
Anthoxanthum	7	4	1	2	t	t	t	t	s	2	1	5	4	1	3	t	t	t	t	t	t	t
Arrhenatherum	1	2	2	2	2	7	9	10	3	10	25	s	2	3	3	10	1	11	19	18	10	25
Bromus	s									s	s	1		1							t	t
Dactylis	8	22	7	8	13	21	30	32	21	12	35	16	13	8	10	19	53	37	40	38	36	48
Festuca rubra	5	6	10	26	5	5	2	3	3	10	7	12	7	12	31	4	5	2	3	3	5	2
Helictotrichon	t	s	t			t	s	t	t	1	3			1	t	t	t	1	s	t	1	1
Holcus	8	3	2	1	s	s	1	3	1	s	s	2	5	1	1	t	s	2	2	2	s	s
Poa pratensis	2	2	3	7	5	4	4	3	5	1	1	1	3	4	4	5	4	3	4	6	1	1
Poa trivialis										t	t	s	t	s	t	t	t	t	t	t	s	s
Trisetum	s	1							t	t	t	1	t	1	t	t				t	s	s
Lathyrus										t		t	t	1	t	s	s	t	t	s	1	s
Achillea	s	t	s	t	s	t	s	1	t	t												
Centaurea	2	2	4	s	1	t	s	s	t	10	3	2	2	s	s	1	1	t		s	1	
Cerastium										1	t											
Conopodium	1	s	2	1	2	t	s	s	1	t	s	s	1	2	s	3	s	t	t	s		t
Galium												1	t	2	s	t		t	t		s	
Heracleum										1	1	t	s	2	t	t	1	s	1	3	2	2
Plantago										17	4			s			t			4	1	
Rumex	15	1	6	13	10	11	9	1	2	s	s	18	14	8	12	9	5	5	1	1	1	s
Taraxacum										23	9			s		t					23	11
Tragopogon										1	1			t							3	3

Received NPK Na Mg Si: 1865-1904

Ground lime applied every fourth year starting 1920  
 Light = 4.43 t CaO ha<sup>-1</sup> and Heavy = 7.61 t CaO ha<sup>-1</sup>

TABLE 21 Botanical Composition (%) of PLOT 4<sup>2</sup>, N<sub>2</sub> P

	Year														
	UNLIMED							LIMED							
	1862	'67	'72	'77	1903	'14	'19	'47	'49	'73	1914	'19	'47	'49	'74
Agrostis	19	14	21	24	2	13	4	69	36	24	1	s	2	2	7
Alopecurus	1	15	4	2	5	2	1	s	1	42	76	32	24	6	6
Anthoxanthum	2	5	1	2	23	8	34	14	10	76	8	1	5	1	7
Arrhenatherum	2	s	2	1	1	s	3				t	2	2	s	
Dactylis	2	s	s	2	t	1	1				t	t	t	s	
Festuca rubra	7	26	49	55	53	73	48	10	35		35	8	30	57	53
Helictotrichon	7	4	s	t		t					s	t	1	t	2
Holcus	16	10	2	6	1	t	s	5	17		s	t	1	t	2
Lolium	6	1	1	s											
Poa pratensis	1	4	5	2	8	1	s				13	13	5	6	19
Poa trivialis	8	2	2	s	s										
Achillea	2	1	2	s	t	t							s	1	s
Centaurea	t	s	1	1	1	t	t								
Conopodium	1	3	s	t											
Galium	t	s	1	1	4	s					s	s	1	s	s
Ranunculus	2	t	t										1	t	s
Rumex	13	8	7	3	s	s	8	1	s		s	1	21	4	2

N<sub>2</sub> P has been applied since 1859, Sawdust 1856-58

TABLE 22 Botanical Composition (%) of PLOT 10, N<sub>2</sub> P Na Mg, UNLIMED

	Year														
	1862	'67	'72	'77	1914	'19	'35	'36	'37	'38	'39	'40	'47	'48	'73
Agrostis	9	9	14	16	3	4	10	4	11	10	30	34	31	52	31
Alopecurus	2	3	10	16	19	21	s	t	1	s	t	t	s	s	t
Anthoxanthum	1	5	3	6	50	21	21	19	33	14	44	31	52	10	69
Arrhenatherum	t	12	13	10	5	26	1	1	2	3	1	1	5	5	t
Bromus	2	1	2	1											
Dactylis	12	5	3	5	1	2	t	t	t	t	t	t	t	s	
Festuca pratensis	1	s	t	t											
Festuca rubra	4	15	20	26	19	7	2	1	1	t	1	2	3	10	t
Helictotrichon	11	2	s	s											
Holcus	9	8	4	5	1	12	64	75	51	73	24	31	7	22	t
Lolium	3	2	1	s											
Poa pratensis	4	15	20	6	1	s	t	t					t	t	
Poa trivialis	10	3	1	s			s								
Trisetum	10	2	1	s											
Achillea	1	2	1	t											
Conopodium	2	2	t	t											
Rumex	10	13	4	6	1	7	t	t	t	t			1	s	t

Also received K 1856-61 and Sawdust 1856-62

TABLE 23 Botanical Composition (%) of PLOT 10, N<sub>2</sub> P Na Mg, LIMED

	Year											
	1914	'19	'35	'36	'37	'38	'39	'40	'47	'48	'74	
Agrostis	3	s	1	2	1	2	1	2	2	1	2	
Alopecurus	47	77	55	49	62	51	64	50	25	29	8	
Anthoxanthum	15	1	2	4	2	1	1	3	11	2	16	
Arrhenatherum	9	8	2	2	6	6	3	8	3	4	20	
Dactylis	1	2	t	t	s	s	t	t				
Festuca rubra	15	5	33	31	20	28	22	26	44	54	39	
Holcus	1	t	t	t	t	1	s	s	1	s	4	
Poa pratensis	4	6	6	12	5	5	6	6	3	3	6	
Achillea									s	1	s	
Galium									1			
Plantago							s		s	t	2	
Rumex	s	s	s	1	3	5	2	4	8	5	1	
Taraxacum			s			s	s	s	s	s	2	

TABLE 24 Botanical Composition (%) of PLOT 9, N<sub>2</sub> PK Na Mg, UNLIMED

	Year																									
	1858	'62	'67	'72	'77	1903	'14	'19	'21	'22	'23	'24	'25	'26	'27	'28	'31	'36	'37	'38	'39	'40	'41	'47	'48	'73
Agrostis	6	13	13	15	12	4	18	12	27	16	23	31	17	25	14	8	12	t	s	2	2	5	6	24	8	15
Alopecurus	s	t	3	1	4	4	2	1	1	14	s	s	1	t	s	s	s	t	s	t	t	t	1	1	1	
Anthoxanthum	t	1	4	2	3	16	39	5	25	8	43	22	13	16	11	10	s	t	s	1	3	s	8	16	s	72
Arrhenatherum	5	4	2	11	13	43	9	47	4	11	8	22	20	6	3	4	2	t		t	t	1	4	4	1	
Bromus				t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	
Dactylis	1	6	5	12	14	5	5	3	1	4	1	t	s	s	s	s	1						s			
Festuca pratensis	1	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	
Festuca rubra	2	5	18	9	22	7	15	4	10	11	12	8	4	1	1	1	7			t	t	t	s	t	t	
Helictotrichon	10	1	s	t	t	t	t	t	t	t	t	t	t	t	t	t										
Holcus	37	12	10	8	10	4	4	12	30	32	12	14	40	51	69	76	76	99	99	97	94	93	85	51	91	13
Lolium	32	4	1	1	s	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	
Poa pratensis	11	13	23	18	12	1	1	s	s	2	s	s	t	t	t	t	t	t	t	t	t	t	t	t	t	
Poa trivialis	9	2	1	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	
Trisetum	9	4	5	1	s	t	t	t	t	s																
Achillea	s	2	2	1	t	s	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	
Conopodium	3	9	1	1	s	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	
Epilobium																										
Heracleum																										
Rumex	1	5	11	5	4	3	4	15	1	s	s	t	1	2	s	s	s	t	t	t	t	t	2	2	s	

In 1930, and 1932-1935 inclusive, *Holcus* made up 100% of the herbage

TABLE 25 Botanical Composition (%) of PLOT 9, N<sub>2</sub> PK Na Mg, LIMED

	Year																									
	1914	'19	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39	'40	'47	'48	'74	'76
Agrostis	3	2	4	4	2	3	2	3	3	3	5	3	2	5	3	5	1	2	s	2	1	3	3	4		
Alopecurus	18	26	22	28	28	45	42	24	38	54	40	57	47	35	26	50	62	58	50	49	69	55	32	38	15	11
Anthoxanthum	13	1	2	s	1	s	1	1	1	3	2	1	1	4	4	3	3	4	3	2	1	2	12	4	s	s
Arrhenatherum	39	47	43	31	36	32	45	50	39	18	18	21	34	39	51	23	15	16	30	24	14	22	13	15	53	41
Bromus	s			s							t	t	s	1	1	3	1	1	t	t	t	1	t	t	t	
Dactylis	7	7	5	8	2	2	4	8	6	2	7	2	4	4	2	6	4	3	9	12	4	4	12	12	2	7
Festuca rubra	9	6	8	5	13	3	2	3	3	8	15	7	2	1	5	3	2	3	1	1	2	5	3	4	t	t
Holcus	2	1	2	1	s	s	s	3	2	s	3	s	1	4	5	s	4	3	3	1	2	2	3	2	6	5
Poa pratensis	8	6	9	22	16	12	3	6	6	9	10	7	6	4	3	5	4	5	2	4	2	4	9	2	1	2
Poa trivialis														t	t	t	t	t	1	s	t	t	t	t	1	2
Lathyrus	t		s			t	t	t	s	s	t	t	t	s	s	1	t	t	t	2	1	1	6	3	11	18
Anthriscus																										
Heracleum	t	s	1	t	t	t	t	t	s	t	s	s	s	s	s	1	3	3	s	s	t	s	t	s	1	1
Rumex	1	3	2	t	s	s	s	1	s	s	t	t	s	1	2	s	s	s	1	2	t	s	2	1	4	9
Taraxacum			s			s	t	t	s	s			s	s	s	s	1	t	s	1	s	1	5	3	2	3



TABLE 26 Botanical Composition (%) of PLOT 11<sup>1</sup>, N<sub>3</sub> P K Na Mg

	Year															
	UNLIMED								LIMED							
	1858	'62	'67	'72	'77	1903	'14	'19	'47	'49	'73	1914	'19	'47	'49	'74
Agrostis	4	13	19	14	29	1	s	2	4			2	1	1		
Alopecurus	3	13	12	10	28	1	1	1	1	t		27	64	79	82	30
Anthoxanthum	t	t	1	s	1	t	t	1	1		5	2	t	1		
Arrhenatherum	3	1	5	10	15	23	7	31	s			27	15	3	2	38
Bromus	1	t	t													
Dactylis	20	24	39	39	17	t	s	s				5	6	2	5	2
Festuca pratensis	2															
Festuca rubra	1	s	s	4	t	t	t	s				s	t	t	s	
Helictotrichon	2	t														
Holcus	26	10	3	10	20	46	91	65	81	100	95	32	12	8	3	22
Lolium	12	1	t	t												
Poa pratensis	9	13	10	10	1	s						3	2	4	5	2
Poa trivialis	13	t	t	s												1
Trisetum	5	s	t	t												
Achillea	1	t														
Anthriscus																1
Conopodium	2	2	t	t												
Epilobium									12	s						
Heracleum					s							s	t			1
Rumex	7	4	1	2	2	t		1				t	t	s	1	3
Taraxacum														2	s	1

This plot received N<sub>4</sub> (192 kg N ha<sup>-1</sup>) between 1856 and 1881 except during 1859-61 when it received N<sub>2</sub> (96 kg N ha<sup>-1</sup>)

TABLE 27 Botanical Composition (%) of PLOT 11<sup>2</sup>, N<sub>3</sub> P K Na Mg Si

	Year													
	UNLIMED							LIMED						
	1862	'67	'72	'77	1914	'19	'47	'49	'73	1914	'19	'47	'49	'74
Agrostis	19	24	10	17	s	1	44	5	2	s	t	s		
Alopecurus	1	6	23	20	18	30	1	s		49	76	70	57	29
Anthoxanthum	1	t	s	s	t	t	t		s			t		s
Arrhenatherum	6	5	13	21	21	46	13	1		25	16	11	17	50
Bromus	1	t	t											
Dactylis	23	38	27	13	s	3	t	t		11	7	8	10	1
Festuca pratensis	2	t												
Festuca rubra	1	2	s	3	t	t	s	t		t	t			t
Helictotrichon	1	t												
Holcus	7	5	11	19	59	20	41	93	98	6	t	2	2	11
Lolium	1	s	s											
Poa pratensis	5	10	12	4	1	t	t			3	s	6	11	1
Poa trivialis	17	1	1	t								t		3
Trisetum	3	2	s	t										
Anthriscus														1
Conopodium	1	1	t	t										
Heracleum				s						1		s	t	1
Rumex	4	4	1	1		s	1	1		s		t	1	2
Taraxacum												1	1	1

Plot 11 was split into 11<sup>1</sup> and 11<sup>2</sup> in 1862 after which 11<sup>2</sup> received Si.  
 Like 11<sup>1</sup> this plot received N<sub>4</sub> (192 kg N ha<sup>-1</sup>) between 1856 and 1881 except during 1859-61 when it received N<sub>2</sub> (96 kg ha<sup>-1</sup>)

TABLE 28 Botanical Composition (%) of PLOT 17, N<sub>1</sub>\*, UNLIMED

	Year															
	1862	'67	'72	'77	1903	'14	'19	'21	'23	'25	'27	'29	'31	'33	'49	'75
Agrostis	11	7	11	18	2	12	6	6	9	3	5	3	4	5	1	6
Alopecurus	24	22	16	13	10	14	13	12	13	14	14	18	18	14	14	24
Anthoxanthum	2	2	4	5	11	5	7	9	7	7	10	3	5	10	9	14
Arrhenatherum	1	s	s	t	s	s	t	s	t	t	s	t	s	t		
Briza	t	t	s	1	2	1	s	s	s	t	s	t	s	s	1	
Bromus	s	2	1	s	s	t	t	t	t				1	t		
Dactylis	2	1	1	1	1	6	8	5	7	28	24	19	23	18	25	5
Festuca rubra	9	11	18	12	13	14	4	12	18	6	5	6	8	7	9	8
Helictotrichon	4	1	4	4	9	4	5	4	3	2	3	2	3	2	2	s
Holcus	8	8	6	11	5	7	11	16	3	10	12	9	15	14	9	3
Lolium	5	3	3	7	s	1	1	s	1	1	t	s	1	s	1	2
Poa pratensis	t	s	t	t	s	t	s	s	1	s	s	s	t	t		
Poa trivialis	5	12	3	2	1	t	s	s	1	1	t	t	s	1	1	s
Trisetum	1	3	5	2	2	1	1	1	1	s	s	s	s	s		
Lotus	t	t	1	1	2	s	s	s			t	t	s			
Achillea	2	1	3	1	3	1	1	t	s	s	s	s	1	1	1	s
Carex	t	t	t	1	t	t	s	s	1	t	s	s	s	1	2	t
Centaurea	4	4	10	3	11	8	9	2	1	2	2	8	6	5	1	1
Cerastium	s	1	3	s	s	s	s	s	s	s	s	s	1	s	t	t
Conopodium	1	2	1	1	1	1	1	t	s	1	s	t	t	s	s	t
Leontodon	t	t	t	s	4	4	3	1	2	1	2	4	2	1	4	4
Luzula	t	s	s	1	1	s	t	s	1	s	s	s	s	s		s
Plantago	4	5	2	8	11	14	24	29	27	17	16	23	8	16	14	24
Ranunculus	2	1	1	2	4	1	1	s	s	1	s	s	t	s	s	4
Rumex	4	7	2	3	2	s	1	t	s	1	1	1	1	2	s	1
Taraxacum	t	t	t	t	1	t	s	s	s	s	t	s	s	s	s	1

\*nitrogen as sodium nitrate

TABLE 29 Botanical Composition (%) of PLOT 17, N<sub>1</sub>\*, LIMED†

	Year										
	1921	'23	'25	'27	'29	'31	'33	'49	'75		
Agrostis	5	4	2	4	1	t	s	1	2		
Alopecurus	10	10	13	14	12	12	9	7	8		
Anthoxanthum	3	3	1	3	s	1	s	1	5		
Arrhenatherum	1	s	t	2	t	1	2	2	1		
Briza	1	s	s	s	1	1	1	1	4		
Bromus		s		t	t	t	t	1			
Dactylis	11	4	15	7	8	10	11	21	11		
Festuca rubra	22	35	22	21	27	28	29	22	13		
Festuca pratensis								1			
Helictotrichon	7	10	16	17	18	16	10	20	17		
Holcus	13	3	6	10	2	4	6	2	4		
Lolium	1	t	s	1	1	1	2	2	7		
Poa trivialis	s	1	1	1	s	1	2	1	t		
Trisetum	2	1	1	2	1	2	3	1	s		
Lotus	1	1	s	1	2	3	2	3	1		
Trifolium pratense		t			t			t	2		
Achillea	s	1	1	1	2	2	1	1	1		
Carex	s	1	t	t	t			t			
Centaurea	4	1	2	2	3	2	s	1	1		
Cerastium	t	1	s	1	1	2	s	t	s		
Conopodium	s	1	1	s	s	t	t	t	t		
Gallium		t	t	1		t		s			
Heracleum	s	s	s		t	t		s	1		
Leontodon	2	1	1	t	3	2	1	2	5		
Pimpinella		t	t	t	t	t			1		
Plantago	18	16	11	8	15	8	17	6	12		
Ranunculus	s	s	2	s	s	s	s	2	s		
Rumex	s	s	1	2	1	1	1	1	s		
Taraxacum	t	s	1	s	1	s	s	1	s		

\*Nitrogen as sodium nitrate

†Liming began in 1920



TABLE 30 Botanical Composition (%) of PLOT 16, N<sub>1</sub>\* P K Na Mg

	Year											
	UNLIMED						LIMED					
	1862	'67	'72	'77	1914	'19	'49	'75	1914	'19	'49	'75
Agrostis	12	14	12	15	5	1	2	1				
Alopecurus	1	8	15	12	26	51	22	29	26	36	11	4
Anthoxanthum	1	2	1	2	3	2	4	6	t	t	s	1
Arrhenatherum	t		s	t	3	3	22	38	1	3	19	42
Bromus	2	3	2	1	8	s			3	t	1	t
Dactylis	2	3	4	5	10	20	10	8	9	19	13	3
Festuca rubra	11	10	10	17	8	2	6	1	31	11	14	3
Helictotrichon	1	2	1	3	5	3	6	1	14	18	15	1
Holcus	10	12	5	13	1	2	1	3	1	s		s
Poa pratensis	t	t	s	s	1	1	s	t	s	s	s	t
Poa trivialis	7	9	6	5	t	s	t	1	2	s	s	3
Lolium	6	6	3	4			t	s				
Trisetum	18	15	19	7	4	1	1	1	3	1	1	t
Lathyrus	t	1	7	9	15	1	12	2	1	1	8	5
Trifolium pratense	2	1	s	t	1			s	s	s	1	2
Trifolium repens					s		s	t	1		s	1
Achillea	2	2	3	2	3	s	4	t	3	1	1	t
Anthriscus			t	t	t	1			1	3	1	3
Centaurea	t		1	s	1	t			1			
Conopodium	4	5	4	s	t	s	1	t				s
Heracleum								t				18
Plantago	1	1	t	s	3	2	6	3	s	1	5	2
Ranunculus	6	s	1	1	s	s	s	5	1	1	s	3
Rumex	5	6	1	2	t	1	s	1	s	1	s	1
Taraxacum	s	t	t	1	1	7	1	1				5
Tragopogon	t	t	t	t	t	1	1		s	t	1	

\*N as sodium nitrate

TABLE 31 Botanical Composition (%) of PLOT 14, N<sub>2</sub>\* P K Na Mg, UNLIMITED

	Year																						
	'67	'72	'77	1903	'14	'19	'20	'21	'22	'23	'24	'25	'35	'36	'37	'38	'39	'40	'41	'47	'48	'75	'76
Agrostis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Alopecurus	3	4	20	29	23	53	48	35	58	42	44	36	62	47	45	45	53	49	59	28	32	37	38
Anthoxanthum	s	t	t	t	s	s	t	t	s	t	t	t	t	t	t	t	t	t	t	s	s	s	t
Arrhenatherum	3	17	41	23	37	48	25	33	39	40	26	33	39	37	31	31	31	29	37	36	37	37	46
Bromus	18	42	8	23	5	3	5	1	5	4	2	2	4	4	t	t	t	7	14	14	3	2	2
Dactylis	10	7	3	12	1	6	3	5	3	5	3	7	2	5	3	6	6	6	7	7	14	3	2
Festuca rubra	1	2	s	3	6	5	t	t	s	t	t	t	t	t	t	t	t	t	t	t	t	t	t
Helictotrichon	1	1	s	2	4	4	s	2	1	1	s	s	t	t	t	1	1	t	t	s	1	1	1
Holcus	7	7	4	13	t	t	t	t	t	t	t	t	t	1	t	s	s	t	t	1	s	s	t
Lolium	14	9	5	3																			
Poa pratensis	1	1	3	4	9	2	1	1	1	1	1	1	1	2	s	s	1	1	4	5	5	1	1
Poa trivialis	22	33	25	22	1	1	7	5	3	8	2	2	1	3	5	5	3	10	1	s	2	5	2
Trisetum	5	7	6	3	s	2	1	t	s	s	t	1	1	t	t	t	t	t	t	s	s	s	s
Lathyrus	t	s	1	1	3	4	2	t	s	t	s	s	1	1	1	1	2	1	1	3	2	1	2
Achillea	s	s	1	1	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t
Anthriscus	1	4	5	9	1	2	t	1	2	6	10	5	3	4	2	1	1	1	5	5	8	2	2
Conopodium	2	2	1	s	t																		
Plantago	s																						
Ranunculus	1	t	t	s	t	t	t	t	t	t	t	t	t	t	t	t	t	t	t	1	2	1	1
Rumex	7	1	1	4	1	s	1	1	1	2	1	2	1	1	3	2	1	1	1	2	s	1	1
Taraxacum	s	s	1	1	2	1	1	2	2	3	2	2	s	s	s	s	t	1	1	3	3	4	3

\*Nitrogen as sodium nitrate



TABLE 33 Botanical Composition (%) of PLOT 13, farmyard manure and fish meal alternating at 2-year intervals, since 1905

	Year														
	UNLIMED							LIMED							
	1914	'19	'44	'45	'46	'47	'48	'74	1914	'19	'44	'45	'46	'47	'48
Agrostis	12	11	8	6	8	11	16	32	2	3	6	7	9	14	10
Alopecurus	18	22	57	46	32	28	32	16	18	35	6	7	9	14	t
Anthoxanthum	4	5	5	5	15	14	6	9	1	2	s	s	1	1	s
Arrhenatherum	22	17	1	2	1	2	3	7	40	20	6	7	11	14	26
Dactylis	8	9	7	6	7	10	9	2	6	10	9	8	27	24	21
Festuca rubra	15	5	4	3	6	4	4	3	11	5	1	2	1	1	1
Helictotrichon	t				t					t		s	s	1	s
Holcus	15	7	3	4	6	6	2	20	14	6	2	2	5	5	4
Poa pratensis	1	2	1	1	t	1	1	1	1	4	1	2	1	2	2
Poa trivialis	t	s	s	t	t	s	t	s	s	s	1	8	6	5	1
Lathyrus	s	t	s	s	s	1	s	s	1	1	31	27	4	6	8
Trifolium pratense	t	t	t	t	t	t	t	2			7	6	2	1	2
Trifolium repens											3	4	1		s
Achillea	s	s	1	s	3	4	4	1	t	s	s	s	s	s	s
Anthriscus	s	s	s	s	1	1	t	1	2	2	2	s	s	s	1
Centaurea	t	s	s	t	t	t	t	s	s	1	4	s	s	2	1
Cerastium	s	3	1	2	1	2	1	1	1	2	s	s	t	t	t
Conopodium	s	1	s	1	1	1	1	1	1	1	s	s	t	t	t
Heracleum															
Leontodon															
Plantago					s	s	2				1	1	1	1	1
Ranunculus	6	12	14	10	15	2	2	t	t	t	16	14	19	11	11
Rumex	2	15	4	6	2	3	2	1	6	1	1	2	1	2	2
Stellaria	t	t	s	1	1	s	t			s	1	1	1	2	1
Taraxacum			s	1	1	1	1	1	t	s	6	4	4	5	3
Tragopogon			s	s	1	1	s	t	t	t	s	2	1	s	1
Veronica											t	1	1	s	t

This plot received N<sub>2</sub> P K Na Mg between 1856 and 1904 (and Straw until 1897)



TABLE 34 Botanical Composition (%) of PLOT 19, FYM (once every four years, since 1905) UNLIMITED

	Year															
	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48				
Agrostis	8	7	18	22	13	14	13	11	9	5	6	8	12			
Alopecurus	13	22	16	13	22	16	17	16	29	26	33	13	6			
Anthoxanthum	1	4	5	10	4	11	4	9	8	9	12	9	7			
Arrhenatherum	4	8	1	8	11	8	11	18	12	18	8	10	6			
Bromus	2	s	t	1	2	1	t					4	3			
Dactylis	12	16	11	5	5	5	7	9	14	17	10	4	3			
Festuca pratensis												2	1			
Festuca rubra	21	6	12	12	18	13	8	8	4	6	8	5	10			
Helictotrichon	2	3	3	4	2	2	1	2	2	3	3	s	1			
Holcus	3	2	2	5	1	3	1	6	4	3	5	3	1			
Poa pratensis	1	s	1	s	1	1	s	s	s	s	s	s	1			
Poa trivialis	2	1	1	2	s	s	s	1	2	s	2	s	s			
Trisetum	9	3	5	5	7	2	4	1	1	2	3	1	2			
Lathyrus	9	6	12	5	7	7	9	4	2	1	2	9	13			
Lotus	1	t			t				t	t	t	t	1			
Trifolium repens	t	t	3	s	t	t	t	s	t	t	t	s	1	3		
Achillea	2	1	2	t	t	s	t	s	t	t	s	t	6	10		
Anthriscus	3	s		s	t	2	1	1	s	1	t	t				
Centaurea	2	s	t	2	s	s	2	s	s	s	s	s	s			
Conopodium	s	2	s	s	1	1	2	1	1	1	1	1	s			
Heracleum												t	1			
Plantago	s	s	s	s	1	1	1	s	t	1	s	s	16	12		
Ranunculus	1	5	3	s	1	4	4	5	2	1	2	6	6			
Rumex	2	8	1	2	2	4	2	4	7	2	3	2	1			
Taraxacum	t	t		s	1	s	1	s	t	t	t	1	s			

This plot received N<sub>1</sub> (as sodium nitrate) and PK between 1872 and 1904

TABLE 35 Botanical Composition (%) of PLOT 19, FYM (once every four years since 1905)

	Year																						
	LIGHT LIMING*								HEAVY LIMING*														
	'20	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48	1920	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48	
Agrostis	15	18	16	15	18	9	9	5	5	3	4	15	14	10	10	8	3	2	2	2	2	2	s
Alopecurus	15	20	16	16	22	30	28	28	43	18	25	22	16	19	24	27	24	27	17	17	21	20	17
Anthoxanthum	4	8	2	9	7	5	8	9	8	3	1	2	3	1	1	1	1	1	1	1	1	1	t
Arrhenatherum	4	s	2	2	1	3	6	6	3	6	5	5	14	5	7	8	15	21	22	16	14	14	
Bromus	s	s	1	1	1	1	1	1	1	1	s	s	t	1	2	t	t	t	t	s	t	s	
Dactylis	9	16	15	6	4	21	15	26	11	4	11	9	9	12	4	5	18	16	17	9	4	14	
Festuca pratensis																							
Festuca rubra	12	10	15	15	10	5	3	3	4	2	5	15	15	15	16	13	7	4	11	14	3	4	
Helictotrichon	4	2	1	3	2	3	4	3	2	2	2	5	5	3	4	6	7	7	11	12	3	5	
Holcus	2	6	2	2	2	2	2	2	3	2	2	2	1	s	s	1	2	1	1	1	1	s	
Poa pratensis	s	1	2	2	1	1	1	1	1	1	1	2	1	2	2	3	2	2	1	1	1	2	
Poa trivialis	s	2	1	1	1	3	6	1	5	1	2	2	2	s	1	1	3	6	5	6	1	1	
Trisetum	4	8	10	7	4	1	1	3	3	s	3	5	10	18	9	7	2	2	4	6	2	3	
Lathyrus	18	2	6	9	18	3	1	1	1	10	7	8	3	7	15	20	1	1	1	1	13	7	
Lotus																							
Trifolium pratense	s								t	1	t	s	t	s	s	s	t	t	1	1	3	2	
Trifolium repens	s	s	t	1	2	t	s	1	s	3	1	1	1	t	1	1	t	t	1	2	1	1	
Achillea	1	s	t	t	s	t	s	s	t	5	5	1	s	s	t	s	t	t	s	s	2	2	
Anthriscus	s	t	t	s	1	s	s	t	s	t	s	t	s	t	s	s	2	1	1	1	s	t	
Centaurea	3	t	s	1	t	t	t	t	1	1	1	t	s	t	t	t	s	s	s	t	2	1	
Cerastium	1	t	t	s	1	t	s	t	s	s	t	s	t	t	s	t	t	t	t	t	s	t	
Conopodium	s	1	1	1	2	1	1	1	1	1	s	s	s	1	2	1	2	1	1	1	s	s	
Heracleum																							
Plantago	s	s	s	t	t	t	t	s	t	14	10	s	t	s	2	s	1	s	1	s	16	10	
Ranunculus	2	1	1	5	7	11	4	3	2	10	8	1	1	1	5	3	5	2	2	1	2	4	
Rumex	1	2	2	2	1	7	6	4	5	4	2	1	s	s	s	s	2	3	1	1	s	s	
Taraxacum	s	t	s	s	t	t	t	t	t	2	1	1	s	s	s	2	2	s	s	s	2	1	
Tragopogon																							
Veronica	s	s	t	s	s	t	s	s	s	2	1	s	s	t	t	t	t	t	t	t	1	3	

This plot received N<sub>1</sub> (as sodium nitrate) and PK between 1872 and 1904

\*Ground Lime applied every fourth year, starting 1920  
Light = 0.64 t CaO ha<sup>-1</sup> and Heavy = 3.53 t CaO ha<sup>-1</sup>

TABLE 36 Botanical Composition (%) of PLOT 20, FYM every fourth year since 1905 with NPK in other years, UNLIMITED

	Year															
	1914	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'46	'48		
Agrostis	4	6	11	13	10	10	15	14	9	4	4	5	3	4		
Alopecurus	11	30	27	19	23	29	16	17	27	30	46	34	34	39		
Anthoxanthum	1	1	1	1	s	s	1	1	1	1	2	1	1	1		
Arrhenatherum	4	5	6	10	7	5	6	9	18	25	11	9	10	15		
Bromus	5	s	s	s	2	2	t	t	t	t	t	t	t	s		
Dactylis	10	12	10	6	9	6	6	10	11	15	7	9	10	15		
Festuca rubra	22	4	10	9	16	14	8	4	3	3	5	6	5	4		
Helictotrichon	6	10	11	12	8	8	5	6	6	5	7	8	3	1		
Holcus	10	7	3	10	3	2	2	4	6	7	4	2	3	1		
Lolium	s	s	s	s	s	1	s	t	t	t	s	s	t	t		
Poa pratensis	s	1	2	1	3	2	1	10	2	1	1	1	s	1		
Poa trivialis	2	1	2	1	s	1	s	s	2	s	1	1	1	1		
Trisetum	6	3	5	7	9	6	5	1	1	3	3	4	1	4		
Lathyrus	6	5	4	3	1	2	12	10	3	2	3	7	5	4		
Trifolium pratense	t	t	1	s	t	s	1	t	s	t	s	s	t	1		
Trifolium repens	t	t	1	s	t	s	1	t	s	t	s	5	t	1		
Achillea	2	1	3	1	2	s	1	2	1	s	s	1	2	s		
Anthriscus	3	2	1	s	1	3	1	5	1	1	s	s	1	s		
Centaurea	3	1	2	1	1	s	2	6	s	t	s	s	s	s		
Conopodium	t	1	t	1	2	1	1	1	1	1	1	1	1	s		
Plantago	t	t	s	s	t	t	s	s	s	t	t	s	3	1		
Ranunculus	s	2	1	1	1	2	3	4	2	s	1	1	5	1		
Rumex	s	3	1	1	1	2	1	2	3	2	1	1	5	1		
Taraxacum	t	t	t	t	t	s	s	s	s	t	t	s	1	1		
Tragopogon	t	t	t	t	t	t	s	t	t	t	t	t	4	3		
Veronica	s	s	t	t	t	t	t	t	t	t	s	s	1	t		

Received P and N and K (as potassium nitrate) between 1872 and 1904

TABLE 37 Botanical Composition (%) of PLOT 20, FYM every fourth year with NPK in other years

	Year																					
	LIGHT LIMING*								HEAVY LIMING*													
	'20	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48	1920	'21	'22	'23	'24	'25	'26	'27	'28	'46	'48
Agrostis	15	10	11	13	9	3	5	3	4	1	2	6	5	5	5	4	3	4	2	1	t	t
Alopecurus	22	22	24	17	27	15	21	19	31	18	22	30	31	33	25	21	19	26	23	24	13	18
Anthoxanthum	2	6	1	6	1	2	4	3	6	3	2	1	2	s	1	s	s	1	1	1	1	s
Arrhenatherum	2	9	5	12	10	33	24	31	19	27	22	2	4	3	2	s	4	8	7	4	15	17
Bromus	s	1	2	2	t	t	t	t	s	s	t	s	1	3	3	t	t	t	t	s	s	s
Dactylis	8	9	11	4	5	13	14	18	7	8	14	9	9	9	3	5	9	13	14	6	4	14
Festuca rubra	10	9	13	15	6	1	3	3	6	4	3	10	7	13	21	10	4	5	5	9	9	5
Helictotrichon	10	8	5	5	5	3	7	8	9	4	3	14	19	7	12	10	16	16	24	29	9	7
Holcus	5	10	4	2	2	4	6	7	8	3	6	7	8	3	2	1	5	8	7	5	1	2
Poa pratensis	s	s	1	1	1	s	1	s	1	s	s	1	1	3	2	2	1	2	2	3	1	3
Poa trivialis	2	2	s	2	1	1	4	1	3	4	4	1	1	s	1	s	1	4	1	3	4	4
Trisetum	3	3	7	3	3	1	1	2	4	2	2	4	5	7	5	3	1	1	3	3	3	3
Lathyrus	15	5	8	10	17	2	1	t	t	2	5	2	5	4	5	30	4	3	3	5	7	9
Trifolium repens	s	t	t	1	t	t	t	t	1	1	3	t	t	t	t	t	t	t	t	s	3	3
Achillea	1	t	s	s	1	s	s	1	1	2	2	1	s	s	s	s	s	1	1	1	s	4
Anthriscus	t	t	s	1	1	6	1	s	3	3	t	1	1	2	3	2	8	1	1	1	s	1
Centaurea	1	t	t	t	t	t	t	1	t	2	1	3	s	s	1	s	2	1	1	1	s	3
Conopodium	s	1	1	1	1	1	s	1	1	1	1	s	1	2	1	2	1	s	1	1	s	t
Plantago	t	s	s	t	t	1	s	s	s	7	6	t	t	t	s	t	s	s	s	s	s	6
Ranunculus	s	1	1	3	4	3	2	s	1	1	2	1	1	1	2	2	9	2	1	1	2	1
Rumex	1	1	1	1	1	5	3	s	2	2	1	1	1	1	1	1	2	1	1	1	s	2
Taraxacum	t	s	s	1	2	3	1	s	1	3	1	t	1	1	1	2	6	1	1	3	3	2
Tragopogon	1	s	s	1	1	1	1	t	t	s	1	s	s	s	1	1	3	1	1	1	s	4
Veronica	t	t	t	t	t	t	s	s	s	s	s	t	t	t	t	t	t	t	t	t	s	s

Received P and N and K (as potassium nitrate) between 1872 and 1904

\*Ground lime applied every fourth year, starting 1920  
 Light = 0.64 t CaO ha<sup>-1</sup> and Heavy = 3.11 t CaO ha<sup>-1</sup>



TABLE 38 Effects of Lime applied between 1965 and 1968 on the Botanical Composition (% Contribution to Hay Weight) in June 1973 of Sub-plots c (pH being raised to 5) compared to that of Sub-plots d (permanently Unlimed, pH 4)

	1 (N <sub>1</sub> )		18 (N <sub>2</sub> KNaMg)		4 <sup>2</sup> (N <sub>2</sub> P)		9 (N <sub>2</sub> PKNaMg)		10 (N <sub>2</sub> PKNaMg)		11 <sup>1</sup> (N <sub>3</sub> PKNaMg)		11 <sup>2</sup> (N <sub>3</sub> PKNaMgSi)		13 (FYM + fish meal)*	
	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c
Agrostis	84.4	19.6	82.7	51.8	14.7	11.3	30.7	36.0	t	1.6	32.3	18.8	32.3	18.8	16.1	15.3
Alopecurus					0.1	0.8	t	0.1	9.1	7.4	16.1	15.3	9.4	5.7	9.4	5.7
Anthoxanthum	11.1	9.5	17.2	23.0	71.7	11.1	69.0	7.8	t	30.0	0.3	t	27.5	27.8	7.0	27.8
Arrhenatherum					2.7	0.1	t	0.1								
Bromus					0.1											
Dactylis					0.5											
Deschampsia								1.4								
Festuca rubra	2.9	48.7	0.1	14.1	t	55.9	0.1	24.1	2.0	4.1	3.2	0.7	4.1	3.2	0.7	0.7
Helictotrichon						0.2										
Holcus	1.3		t	0.8	13.5	44.3	0.1	21.2	94.9	36.7	98.1	30.9	20.3	13.8	0.1	0.1
Poa pratensis	2.5			1.5	16.1	16.1	0.1	7.4	11.7	11.7	13.4	13.4	0.3	1.3	0.3	1.3
Poa trivialis	0.1				0.6	0.6	0.2	0.2	3.4	3.4	7.8	7.8	0.2	0.2	0.2	0.2
Lolium																
Trisetum																
<b>Total</b>	<b>98.4</b>	<b>81.7</b>	<b>100.0</b>	<b>93.3</b>	<b>100.0</b>	<b>99.8</b>	<b>100.0</b>	<b>90.6</b>	<b>99.9</b>	<b>98.5</b>	<b>100.0</b>	<b>99.3</b>	<b>100.0</b>	<b>98.4</b>	<b>91.1</b>	<b>86.1</b>
Lathyrus	0.5		t	t	3.5	3.5	0.3	0.3							0.2	5.4
Trifolium pratense	1.2		0.2	0.2	t										1.9	3.7
<b>Total</b>	<b>1.6</b>	<b>1.6</b>	<b>0.3</b>	<b>0.3</b>	<b>3.5</b>	<b>3.5</b>	<b>0.6</b>	<b>0.6</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>2.1</b>	<b>9.1</b>
Achillea	0.2			0.3											1.2	0.3
Anthriscus															0.3	0.3
Centaurea	1.5			0.4											0.2	0.1
Cerastium	2.4			0.9											t	t
Conopodium				0.1											0.9	0.9
Heracleum				0.7				2.7							1.1	0.1
Hypochoeris	0.9															
Hypochaeris	0.1															
Leontodon	0.2			t												
Linum																
Luzula	1.0			t											0.1	t
Pimpinella															1.8	0.9
Plantago				0.2												
Potentilla	4.8															
Poterium	0.6															
Ranunculus																
Rumex	1.0			2.5				0.6		0.1					0.7	1.8
Taraxacum	2.7			0.9				2.1		1.0					0.7	0.2
Tragopogon	0.7			0.4											0.7	0.2
<b>Total</b>	<b>1.6</b>	<b>16.7</b>	<b>6.5</b>	<b>6.5</b>	<b>5.9</b>	<b>5.9</b>	<b>1.4</b>	<b>1.4</b>	<b>0.7</b>	<b>0.7</b>	<b>1.6</b>	<b>1.6</b>	<b>6.7</b>	<b>6.7</b>	<b>4.7</b>	<b>4.7</b>

\*Analysed in 1974, t = <0.05%

Table 39 Effects of Lime applied between 1965 and 1968 on the amounts ( $t\ ha^{-1}$ ) of different species in June 1973 on Sub-plots c (pH being raised to 5) compared to that on Sub-plots d (permanently Unlimed, pH approximately 4)

	1 ( $N_1$ )		18 ( $N_2\ KNaMg$ )		4 <sup>2</sup> ( $N_2\ P$ )		9 ( $N_2\ PKNaMg$ )		10 ( $N_2\ PNaMg$ )		11 <sup>1</sup> ( $N_3\ PKNaMg$ )		11 <sup>2</sup> ( $N_3\ PKNaMgSi$ )		13 (FYM + fish meal)*	
	d	c	d	c	d	c	d	c	d	c	d	c	d	c	d	c
Agrostis	0.51	0.41	0.94	1.68	0.62	0.80	0.66	0.83	0.96	1.67	0.11	0.14	1.18	0.80	1.18	0.80
Alopecurus							t	0.06	t	0.01		0.64	0.66	0.59	0.66	
Anthoxanthum	0.06	0.20	0.20	0.75	1.96	0.19	3.21	0.82	2.15	0.36	0.24	t	0.34	0.24	0.24	
Arrhenatherum				0.05			0.20	0.20	t	0.01	2.41	2.36	0.26	1.19	1.19	
Bromus				t			0.01									
Dactylis				0.01						0.07	0.50	0.50	0.08	0.12	0.12	
Deschampsia										0.01						
Festuca rubra	0.01	1.02	t	0.46	t	2.14	0.26	0.26	t	1.12	0.16	0.35	0.12	0.03	0.03	
Helictotrichon				0.01		0.10										
Holcus	0.03	t	t	0.03			0.60	3.25	t	0.98	4.41	2.66	0.74	0.59	0.59	
Lolium													0.01		0.01	
Poa pratensis	0.05			0.05		0.47	1.18	1.18	t	0.34	0.94	1.15	0.74	0.59	0.59	
Poa trivialis	t			0.11		0.11	0.05	0.05		0.01	0.27	0.68	0.01	0.03	0.03	
Trisetum													0.01	t	t	
<b>Total</b>	<b>0.58</b>	<b>1.71</b>	<b>1.14</b>	<b>3.03</b>	<b>2.58</b>	<b>3.82</b>	<b>4.47</b>	<b>6.66</b>	<b>3.11</b>	<b>4.58</b>	<b>4.65</b>	<b>7.04</b>	<b>8.48</b>	<b>3.34</b>	<b>3.66</b>	
Lathyrus	0.01			t			0.26	0.26						0.01	0.23	
Trifolium pratense	0.02			0.01										0.07	0.16	
<b>Total</b>	<b>0.03</b>			<b>0.01</b>			<b>0.26</b>	<b>0.26</b>						<b>0.08</b>	<b>0.39</b>	
Achillea	0.01			0.01						0.01				0.04	0.01	
Anthriscus														0.01	0.01	
Centaurea	0.03			0.01				0.05			0.02			0.01	t	
Cerastium	0.05			0.03							t			0.02	t	
Conopodium				t										0.03	0.04	
Heracleum	0.02			0.02			0.20							0.03	0.04	
Hypochoeris														0.04	t	
Leontodon	t			t										t	t	
Linum	t			t										0.07	0.04	
Luzula	0.02			t												
Pimpinella	0.01															
Plantago	0.10			0.01		t										
Potentilla	t															
Poterium	0.01															
Ranunculus	0.02			0.08		t		0.04	t	t				0.03	0.08	
Rumex	0.06			0.03				0.15						0.01	t	
Taraxacum	0.02			0.01						0.05				0.03	t	
Tragopogon																
<b>Total</b>	<b>t</b>	<b>0.35</b>	<b>1.14</b>	<b>0.20</b>	<b>2.58</b>	<b>3.83</b>	<b>4.48</b>	<b>7.36</b>	<b>3.11</b>	<b>4.64</b>	<b>4.65</b>	<b>7.04</b>	<b>8.63</b>	<b>0.25</b>	<b>0.18</b>	
<b>Total yield</b>	<b>0.59</b>	<b>2.09</b>	<b>1.14</b>	<b>3.25</b>	<b>2.58</b>	<b>3.83</b>	<b>4.48</b>	<b>7.36</b>	<b>3.11</b>	<b>4.64</b>	<b>4.65</b>	<b>7.04</b>	<b>8.63</b>	<b>3.67</b>	<b>4.23</b>	

\*Based on 1974 analysis, t < 0.005 t ha<sup>-1</sup>

TABLE 40 Effects of Lime applied between 1965 and 1968 on the Botanical Composition (%) in June 1974 of Sub-plots *b* (pH being raised to 6) compared to that of Sub-plots *a* (Limed once every Four Years under the old Liming Scheme)

	4 <sup>2</sup> (N <sub>2</sub> P)		9 (N <sub>2</sub> PKNaMg)		10 (N <sub>2</sub> PNaMg)		11 <sup>1</sup> (N <sub>3</sub> PKNaMg)		11 <sup>2</sup> (N <sub>3</sub> PKNaMgSi)	
	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>
Agrostis	6.9	6.9			2.2	3.4				
Alopecurus	5.7	7.0	15.3	8.1	7.6	6.9	29.6	17.0	28.7	0.2
Anthoxanthum	7.0	9.6	0.2	1.5	16.3	17.9			0.2	15.2
Arrhenatherum	0.5		53.4	50.7	19.6	22.3	38.3	63.9	50.3	60.8
Bromus			t							
Dactylis	t		1.9	4.3			2.3	2.0	1.3	4.8
Festuca rubra	53.1	40.9	0.1	1.5	38.9	36.6		0.1	0.1	
Helictotrichon	0.8	11.7	0.7	1.5		0.7				
Holcus	2.2	1.5	6.5	5.6	3.9	6.8	21.8	7.1	10.6	2.8
Poa pratensis	19.5	15.8	2.4	1.3	5.8	2.5	2.0	2.9	1.2	1.8
Poa trivialis			1.5	t			0.9	0.6	3.0	10.1
Trisetum				0.5						
<b>Total</b>	<b>95.8</b>	<b>93.3</b>	<b>82.1</b>	<b>75.0</b>	<b>94.3</b>	<b>97.1</b>	<b>94.9</b>	<b>93.6</b>	<b>95.4</b>	<b>95.8</b>
Lathyrus			11.0	15.6	0.2		0.1	t	0.2	t
Trifolium pratense				0.4						
<b>Total</b>			<b>11.0</b>	<b>16.0</b>	<b>0.2</b>		<b>0.1</b>	<b>t</b>	<b>0.2</b>	<b>t</b>
Achillea	0.3	0.5	t		0.2	0.2			0.6	2.0
Anthriscus			0.5	2.8		t	0.5	0.5		
Cerastium			t			t				
Conopodium				t		t				
Galium	0.3	0.5	4.0	3.3	0.1	0.2	0.9	1.1	1.4	1.7
Heracleum										
Hypochoeris	0.5									
Pimpinella	t	0.4				0.4				
Plantago	0.3	1.2			1.9					
Poterium	t									
Ranunculus	0.2				0.1	0.1				
Rumex	2.2	4.0	0.5	0.4	0.9	0.4	2.6	2.9	1.8	0.3
Taraxacum	0.3	0.1	1.9	2.4	2.3	1.5	1.0	1.9	0.6	0.2
<b>Total</b>	<b>4.2</b>	<b>6.7</b>	<b>6.9</b>	<b>9.0</b>	<b>5.5</b>	<b>2.9</b>	<b>5.0</b>	<b>6.4</b>	<b>4.4</b>	<b>4.2</b>

t = < 0.05%

TABLE 41 Effects of Lime applied between 1965 and 1968 on the amounts ( $t\ ha^{-1}$ ) of different species in June 1974 on sub-plots *b* (pH being raised to 6) compared to that on sub-plots *a* (Limed once every Four Years under the old Liming Scheme)

	$4^2$ ( $N_2P$ )		9 ( $N_2PKNaMg$ )		10 ( $N_2PNaMg$ )		$11^1$ ( $N_3PKNaMg$ )		$11^2$ ( $N_3PKNaMgSi$ )	
	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>
Agrostis	0.19	0.19			0.08	0.12				
Alopecurus	0.16	0.20	1.01	0.51	0.28	0.23	1.98	1.02	2.09	0.01
Anthoxanthum	0.19	0.28	0.01	0.10	0.60	0.61			0.01	1.19
Arrhenatherum	0.01		3.52	3.21	0.73	0.76	2.56	3.85	3.67	4.75
Bromus			t							
Dactylis	t		0.12	0.27			0.16	0.12	0.09	0.37
Festuca rubra	1.48	1.17	0.01	0.09	1.45	1.24		t	0.01	
Helictotrichon	0.02	0.33	0.05	0.10						
Holcus	0.06	0.04	0.43	0.36	0.14	0.23	1.46	0.43	0.77	0.22
Poa pratensis	0.54	0.45	0.16	0.08	0.22	0.09	0.14	0.17	0.09	0.14
Poa trivialis			0.10	t			0.06	0.04	0.22	0.79
Trisetum				0.03						
<b>Total</b>	<b>2.67</b>	<b>2.68</b>	<b>5.41</b>	<b>4.75</b>	<b>3.51</b>	<b>3.30</b>	<b>6.34</b>	<b>5.64</b>	<b>6.95</b>	<b>7.48</b>
Lathyrus			0.73	0.99	0.01		t	t	0.01	t
Trifolium pratense				0.02						
<b>Total</b>	-	-	<b>0.73</b>	<b>1.01</b>	<b>0.01</b>	-	<b>t</b>	<b>t</b>	<b>0.01</b>	<b>t</b>
Achillea	0.01	0.02	t		0.01	0.01				
Anthriscus			0.03	0.18			0.03	0.03	0.04	0.16
Cerastium			t							
Conopodium				t						
Galium	0.01	0.01			t	0.01				
Heracleum			0.26	0.21			0.06	0.07	0.10	0.14
Hypochoeris	0.01									
Pimpinella	t	0.01								
Plantago	0.01	0.03								
Poterium	t				0.07	0.01				
Ranunculus	0.01									
Rumex	0.06	0.12	0.03	0.03	t	t	0.18	0.18	0.13	0.02
Taraxacum	0.01	t	0.13	0.15	0.09	0.05	0.06	0.12	0.04	0.01
<b>Total</b>	<b>0.12</b>	<b>0.19</b>	<b>0.45</b>	<b>0.57</b>	<b>0.21</b>	<b>0.10</b>	<b>0.33</b>	<b>0.39</b>	<b>0.32</b>	<b>0.33</b>
<b>Total yield</b>	<b>2.79</b>	<b>2.87</b>	<b>6.59</b>	<b>6.33</b>	<b>3.72</b>	<b>3.40</b>	<b>6.68</b>	<b>6.03</b>	<b>7.29</b>	<b>7.81</b>

t = < 0.005 t/ha

TABLE 42 Botanical Composition (%) of Unlimed (U) and Limed (L) halves of Plots 3, 7, 8, 14, 16 and 17 in June 1975

	3 (Unmanured)		7 (PKNaMg)		8 (PNaMg)		17 (N <sub>1</sub> *)		16 (N <sub>1</sub> *PKNaMg)		14 (N <sub>2</sub> *PKNaMg)	
	U	L	U	L	U	L	U	L	U	L	U	L
Agrostis	15.5	2.3	29.0	0.4	4.6	4.0	6.1	1.9	1.0	4.3	36.8	13.4
Alopecurus	2.5	1.0	7.3	5.2	2.8	1.0	24.4	7.9	28.8	1.1	0.3	t
Anthoxanthum	7.2	6.5	11.3	1.1	9.6	13.1	14.2	5.3	6.1	42.4	37.0	39.8
Arrhenatherum	0.2	0.2	0.4	30.8	2.0	6.1	0.3	0.8	37.6	0.1	1.3	2.4
Briza	1.0	2.0	t	0.9	0.1	1.6	0.2	3.9				
Bromus												
Cynosurus	2.2	0.1	5.0	3.0	1.9	1.5	5.0	t	7.8	3.1	2.7	1.4
Dactylis	33.2	2.2	14.7	0.3	15.6	11.7	7.8	13.4	1.0	3.4	2.7	2.7
Festuca rubra												
Festuca pratensis	0.3	8.5	0.1	0.3	0.3	3.6	0.3	0.2	0.6	1.5	0.4	4.2
Helictotrichon	1.5	4.3	6.5	2.5	16.7	12.0	2.7	16.7	3.0	0.4	0.4	4.2
Holcus	0.2	0.9	1.3	0.6	0.2	0.9	0.2	t	0.1	t	0.4	5.6
Poa pratensis	0.4	0.4	0.2	1.1	0.4	1.2	0.2	0.1	0.8	3.1	4.6	0.2
Poa trivialis												
Lolium	0.1	1.0	1.0	0.8	1.0	1.4	2.0	7.4	0.2	t	0.2	0.2
Trisetum												
<b>Total</b>	<b>64.0</b>	<b>43.0</b>	<b>75.9</b>	<b>47.8</b>	<b>55.6</b>	<b>63.8</b>	<b>63.5</b>	<b>72.4</b>	<b>87.1</b>	<b>59.7</b>	<b>83.5</b>	<b>71.8</b>
Lathyrus	0.5	1.7	5.4	14.0	0.3	0.1	0.1	1.1	1.8	4.9	1.5	8.4
Lotus	2.5	3.0	0.1	0.1	1.1	2.0	0.1	1.0	0.2	2.1	0.6	0.9
Trifolium pratense	3.3	7.2	3.9	7.7	7.2	7.6	0.1	2.0	0.2	0.6	7.6	9.3
Trifolium repens	0.2	0.3	1.2	0.5	0.8	0.4	t	0.1	t	0.1	1.5	0.1
<b>Total</b>	<b>6.6</b>	<b>12.2</b>	<b>10.6</b>	<b>22.2</b>	<b>9.4</b>	<b>10.1</b>	<b>0.1</b>	<b>3.1</b>	<b>2.0</b>	<b>7.6</b>	<b>1.5</b>	<b>9.3</b>
Achillea	1.3	1.3	0.7	t	0.9	1.6	0.4	1.1	0.1	0.1	8.3	4.7
Anthriscus	0.1			0.6			0.1			3.1		
Ajuga												
Carex	1.5	1.2	2.5		2.3	t	1.5	1.2				
Centaurea	0.3	0.2	1.1	0.3	0.2	0.8	0.1	0.4	0.1	0.5	0.1	t
Cerastium	0.2	0.2		0.1	0.5	0.2	t	t				
Conopodium												
Galium												
Heraclium	0.1		0.3	7.2			0.1	0.7	0.1	18.1	0.1	1.5
Hypochaeris	0.4											
Knautia	10.0	0.3			1.0	0.4	4.4	5.4				
Leontodon		12.2			8.3	6.2						
Linum		t										
Luzula	1.4	2.2	1.2		2.9	2.2	0.3	0.7				
Pimpinella	0.3	0.4			t	0.3	t	0.9	2.9	1.6	t	t
Plantago	6.1	10.3	6.7	3.3	16.2	9.5	23.9	12.4				
Potentilla	6.9	11.7						0.4				
Ranunculus	0.7	1.6	0.2	7.7	1.9	2.5	3.7	0.3	5.3	3.2	0.7	4.0
Rumex	0.1	0.1	0.2	1.9	0.1	0.3	0.9	0.4	1.0	1.4	1.5	0.8
Taraxacum	0.1	0.3	0.4	8.8	0.6	0.4	0.9	0.4	1.4	4.8	4.5	7.9
Tragopogon		t										
Veronica												
<b>Total</b>	<b>29.3</b>	<b>44.8</b>	<b>13.5</b>	<b>30.0</b>	<b>35.0</b>	<b>26.1</b>	<b>36.4</b>	<b>24.5</b>	<b>10.9</b>	<b>32.7</b>	<b>15.0</b>	<b>18.9</b>

\* = N as sodium nitrate t = < 0.05%



TABLE 43 The amounts ( $t\ ha^{-1}$ ) of different species in the Unlimed (U) and Limed (L) halves of Plots 3, 7, 8, 14, 16 and 17 in June 1975

	3 (Unmanured)		7 (PKNaMg)		8 (PNaMg)		17 (N <sub>1</sub> *)		16 (N <sub>1</sub> *PKNaMg)		14 (N <sub>2</sub> *PKNaMg)	
	U	L	U	L	U	L	U	L	U	L	U	L
Agrostis	0.13	0.04	0.94	0.02	0.13	0.09	0.13	0.04	0.04	0.04	1.77	0.58
Alopecurus	0.02	0.02	0.24	0.25	0.08	0.02	0.52	0.19	1.26	0.20	0.01	t
Anthoxanthum	0.06	0.11	0.36	0.05	0.27	0.30	0.30	0.12	0.27	0.05	1.77	1.74
Arrhenatherum	t	t	0.01	1.51	0.06	0.14	0.01	0.02	1.64	1.95	t	t
Briza	0.01	0.03	t	0.04	t	0.04	t	0.09	t	t	0.06	0.11
Bromus	0.01	0.03	t	0.04	t	0.04	t	0.09	t	t	0.06	0.11
Cynosurus	0.02	0.03	0.16	0.15	0.05	0.04	0.10	0.26	0.34	0.14	0.13	0.06
Dactylis	0.27	0.21	0.48	0.02	0.44	0.27	0.17	0.31	0.04	0.16	0.13	0.12
Festuca rubra	t	t	0.03	0.03	0.01	0.08	0.01	0.08	0.01	0.01	0.09	0.09
Festuca pratensis	t	0.14	t	0.02	0.01	0.27	0.01	0.39	0.03	0.07	0.02	0.18
Helictotrichon	0.01	0.07	0.21	0.12	0.47	0.13	0.06	0.09	0.13	0.02	0.02	0.01
Holcus	t	0.01	0.04	0.03	0.01	0.02	0.04	0.17	0.01	t	0.02	0.01
Lolium	t	0.01	0.01	0.03	0.01	0.03	t	t	t	t	0.02	0.24
Poa pratensis	t	0.01	0.01	0.05	0.01	0.03	t	t	0.03	0.14	0.22	0.01
Poa trivialis	t	0.02	0.04	0.04	t	0.03	t	t	t	t	t	0.01
Trisetum	t	0.02	0.04	0.04	t	0.03	t	t	t	t	t	0.01
<b>Total</b>	<b>0.52</b>	<b>0.70</b>	<b>2.46</b>	<b>2.34</b>	<b>1.55</b>	<b>1.46</b>	<b>1.34</b>	<b>1.70</b>	<b>3.81</b>	<b>2.75</b>	<b>4.00</b>	<b>3.13</b>
Lathyrus	t	0.03	0.17	0.68	0.01	t	t	0.02	0.08	0.22	0.07	0.37
Lotus	0.02	0.05	t	0.05	0.03	0.05	t	0.02	0.08	0.22	0.07	0.37
Trifolium pratense	0.03	0.12	0.13	0.38	0.20	0.17	t	0.05	0.01	0.10	0.04	0.04
Trifolium repens	t	t	0.04	0.02	0.02	0.01	t	t	t	0.03	0.03	0.04
<b>Total</b>	<b>0.05</b>	<b>0.20</b>	<b>0.34</b>	<b>1.09</b>	<b>0.26</b>	<b>0.23</b>	<b>t</b>	<b>0.07</b>	<b>0.09</b>	<b>0.35</b>	<b>0.07</b>	<b>0.41</b>
Achillea	0.01	0.02	0.02	t	0.02	0.04	0.01	0.03	0.01	t	0.40	0.20
Anthriscus	t	t	t	0.03	t	t	t	t	t	0.14	0.40	0.20
Ajuga	t	0.04	0.04	0.02	0.08	0.04	t	0.03	0.01	0.14	0.40	0.20
Carex	0.01	0.02	0.08	0.02	0.06	0.04	0.03	0.03	0.01	0.14	0.40	0.20
Centaurea	t	t	t	0.02	0.01	0.02	t	0.01	t	0.02	0.01	0.01
Cerastium	t	t	0.04	0.01	0.02	t	t	t	t	0.02	0.01	0.01
Conopodium	t	t	0.04	0.01	0.02	t	t	t	t	0.02	0.01	0.01
Galium	t	t	0.01	0.35	0.01	t	t	t	0.01	0.83	t	0.06
Heracleum	t	t	0.01	0.35	0.01	t	t	t	0.01	0.83	t	0.06
Hypochoeris	t	t	0.01	0.35	0.01	t	t	t	0.01	0.83	t	0.06
Knautia	t	t	0.01	0.35	0.01	t	t	t	0.01	0.83	t	0.06
Leontodon	0.08	0.20	0.08	0.20	0.23	0.14	0.09	0.13	0.01	0.14	0.40	0.20
Linum	0.01	0.03	0.04	0.02	0.08	0.05	0.01	0.02	0.01	0.14	0.40	0.20
Luzula	0.05	0.17	0.22	0.16	0.45	0.22	0.51	0.29	0.13	0.07	0.06	0.06
Pimpinella	0.06	0.20	0.01	0.38	0.05	0.06	0.08	0.01	0.23	0.15	0.03	0.17
Plantago	0.05	0.17	0.22	0.16	0.45	0.22	0.51	0.29	0.13	0.07	0.06	0.06
Poterium	0.06	0.20	0.01	0.38	0.05	0.06	0.08	0.01	0.23	0.15	0.03	0.17
Ranunculus	t	t	0.01	0.09	0.02	0.01	0.02	0.01	0.04	0.06	0.07	0.03
Rumex	t	t	0.01	0.43	0.02	0.01	0.02	0.01	0.06	0.22	0.21	0.34
Taraxacum	t	t	0.01	0.43	0.02	0.01	0.02	0.01	0.06	0.22	0.21	0.34
Tragopogon	t	t	0.01	0.43	0.02	0.01	0.02	0.01	0.06	0.22	0.21	0.34
Veronica	t	t	0.01	0.43	0.02	0.01	0.02	0.01	0.06	0.22	0.21	0.34
<b>Total</b>	<b>0.24</b>	<b>0.73</b>	<b>0.44</b>	<b>1.47</b>	<b>0.98</b>	<b>0.60</b>	<b>0.77</b>	<b>0.58</b>	<b>0.48</b>	<b>1.50</b>	<b>0.72</b>	<b>0.82</b>
<b>Total yield</b>	<b>0.81</b>	<b>1.63</b>	<b>3.24</b>	<b>4.90</b>	<b>2.79</b>	<b>2.28</b>	<b>2.12</b>	<b>2.35</b>	<b>4.38</b>	<b>4.60</b>	<b>4.80</b>	<b>4.36</b>

\* = N as sodium nitrate t = < 0.005 t ha<sup>-1</sup>

TABLE 44 Botanical Composition (%) of Unlimed (U) and Limed (L) Halves of Plots 3, 7 and 14 and of Sub-Plots a, b and c of Plot 9 in June 1976

	3 (Unmanured)		7 (PKNaMg)		14 (N <sub>2</sub> *PKNaMg)		9 (N <sub>2</sub> PKNaMg)		
	U	L	U	L <sup>P</sup>	U	L	a <sup>+</sup>	b	c
Agrostis	23.3	1.6	31.1					t	3.5
Alopecurus	0.3	0.9	2.7	E	38.5	9.8	11.2	11.1	2.1
Anthoxanthum	2.0	2.5	4.7	J	0.1	0.5	0.2	2.6	2.3
Arrhenatherum	t	0.3	0.7	A	46.5	53.6	41.3	33.9	9.6
Briza	0.6	2.2		I	0.1	0.5		t	0.1
Bromus		t							
Cynosurus	0.9	1.6	3.2	B	2.5	2.3	6.8	4.7	0.1
Dactylis	32.3	12.0	22.7			5.4	0.1	1.1	2.1
Festuca rubra	0.4	4.6	0.2	G		1.2	t	0.9	
Helictotrichon	0.9	1.8	6.4	H	0.1	0.1	4.8	6.2	60.6
Lolium	0.2	0.7	0.2			0.2			
Poa pratensis	0.2	0.9	1.5	F	0.9	4.8	1.3	5.9	11.9
Poa trivialis	t	0.1	0.2	C	2.3	3.8	1.9	0.2	0.9
Trisetum	t	1.1	t	D	0.2	0.3	0.1		
<b>Total</b>	<b>61.1</b>	<b>30.6</b>	<b>73.6</b>	<b>40.0</b>	<b>91.3</b>	<b>82.5</b>	<b>67.8</b>	<b>66.7</b>	<b>93.2</b>
Lathyrus	0.4	1.3	6.9	A	2.0	7.4	17.9	21.1	3.9
Lotus	1.4	3.9	1.0						
Trifolium pratense	2.1	4.9	4.6	B		0.2		0.6	0.4
Trifolium repens	0.2	t	0.3	C		0.4			
<b>Total</b>	<b>4.1</b>	<b>10.1</b>	<b>12.7</b>	<b>47.1</b>	<b>2.0</b>	<b>8.0</b>	<b>17.9</b>	<b>21.8</b>	<b>4.3</b>
Achillea	0.8	1.2	1.2	H	0.1	t	t	0.6	t
Anthriscus	1.1	1.3			2.5	2.9	1.1		t
Carex	1.3	1.4	0.7						
Centaurea	t	0.5	t	F			t	t	
Cerastium	0.4	0.1	2.2	G		0.1	t	0.3	t
Conopodium	0.1								
Galium			0.1	B	t	1.2	9.3	4.9	0.2
Heracleum	0.1	t							
Hieracium	1.6	0.9	0.3						
Hypochaeris	0.2	0.2							
Knautia	14.3	18.7	0.3						
Leontodon		t							
Linum	1.1	0.8	0.6						
Luzula	0.8	0.9							
Pimpinella	6.7	14.6	6.8	D		0.1			
Plantago	5.6	16.7							
Poterium	0.5	1.2	0.1	C	0.1	1.1	0.8	1.5	0.2
Ranunculus	t	0.1	0.2	E	0.6	0.1	2.9	4.1	1.9
Rumex	0.2	0.2	0.6	A	3.3	3.9			
Taraxacum	0.1	0.5							
Tragopogon	t								
Veronica									
<b>Total</b>	<b>34.8</b>	<b>59.3</b>	<b>13.7</b>	<b>12.9</b>	<b>6.7</b>	<b>9.4</b>	<b>14.3</b>	<b>11.5</b>	<b>2.4</b>

P = Plot 7L was only partially analysed and species within the tree main groups were ranked for relative abundance, A being the most abundant in each group.  
<sup>+</sup> = Under the new liming scheme the pH of sub-plots a will be raised to 7, 9a received 14 t ground chalk ha<sup>-1</sup> in January 1976.  
 \* = N as sodium nitrate  
 t = < 0.05%

**TABLE 45** The amounts ( $t\ ha^{-1}$ ) of different species on the Unlimed (U) and Limed (L) halves of Plots 3, 7 and 14 and of Sub-plots a, b and c of Plot 9 in June 1976

	3 (Unmanured)			7 (PKNaMg)		14 ( $N_2$ *PKNaMg)		9 ( $N_2$ *PKNaMg)		
	U	L	L <sup>P</sup>	U	L <sup>P</sup>	U	L	a	b	c
Agrostis	0.23	0.02		0.76						
Alopecurus	t	0.01		0.06		1.87	0.41	0.65	t	0.16
Anthoxanthum	0.02	0.03		0.11		t	0.02	0.01	0.62	0.09
Arrhenatherum	t	t		0.02		2.26	2.25	2.41	1.88	0.10
Briza	0.01	0.03				t	0.02		t	0.43
Bromus										
Cynosurus	0.01	0.02		0.08		0.12	0.10	0.39	0.26	t
Dactylis	0.32	0.16		0.56		t	0.23	t	0.06	0.09
Festuca rubra	t	0.06		t		t	0.05	t	0.05	
Helictotrichon	0.01	0.02		0.16		0.01	t	0.28	0.34	2.72
Holcus	t	0.01		t		0.01	0.01	0.08	0.33	0.53
Lolium	t	0.01		0.04		0.04	0.20	0.11	0.01	0.04
Poa pratensis	t	t		t		0.11	0.16	0.11	0.01	
Poa trivialis	t	0.01		t		0.01	0.01	0.01		
Trisetum	t	0.01		t		0.01	0.01	0.01		
<b>Total</b>	<b>0.61</b>	<b>0.42</b>	<b>2.03</b>	<b>1.80</b>	<b>2.03</b>	<b>4.44</b>	<b>3.47</b>	<b>3.95</b>	<b>3.71</b>	<b>4.18</b>
Lathyrus	t	0.02		0.17		0.10	0.31	1.04	1.17	0.18
Lotus	0.01	0.05		0.02						
Trifolium pratense	0.02	0.07		0.11		0.01	0.01	0.01	0.03	0.02
Trifolium repens	t	t		0.01		0.02	0.02			
<b>Total</b>	<b>0.04</b>	<b>0.14</b>	<b>2.39</b>	<b>0.31</b>	<b>2.39</b>	<b>0.10</b>	<b>0.34</b>	<b>1.04</b>	<b>1.21</b>	<b>0.20</b>
Achillea		0.02		0.03		t	t	t	0.03	t
Anthriscus		0.02				0.12	0.12	0.06		t
Carex	0.01	0.02		0.02						
Centaurea	0.01	0.02		t						
Cerastium	t	0.01		t						
Conopodium	t	t		0.05			t	t	t	t
Gallium	t	t		t					0.02	
Hieracium	t	t		t		t	0.05	0.54	0.27	0.01
Hypochaeris	0.02			0.01						
Knautia	t	0.01								
Leontodon	0.14	0.25		t						
Linum	t	t								
Luzula	0.01	0.01		0.01						
Pimpinella	0.01	0.01		0.01						
Plantago	0.07	0.20		0.17			t			
Poterium	0.06	0.23		t						
Ranunculus	t	0.02		t		0.01	0.05	0.05	0.08	0.01
Rumex	t	t		t		0.03	t	0.17	0.23	0.08
Taraxacum	t	t		0.01		0.16	0.17			
Tragopogon	t	0.01								
Veronica	t									
<b>Total</b>	<b>0.35</b>	<b>0.80</b>	<b>0.65</b>	<b>0.32</b>	<b>0.65</b>	<b>0.32</b>	<b>0.40</b>	<b>0.83</b>	<b>0.64</b>	<b>0.11</b>
Total yield	1.00	1.36	5.07	2.43	5.07	4.86	4.21	5.82	5.56	4.49

\*N as sodium nitrate, P = partial analysis only, grasses, legumes and other species separated