

Appendix 1: IGER tables of treatment means and statistical analyses for 2003. Statistical analyses by GENSTAT version 6.

Table 1. Effect of frequency of digestate application and cutting on total C and total N content of herbage and C:N ratio.

	FREQUENCY (WEEKS)				s.e.d.	<i>P</i>
	2	4	6	8		
No. of samples	(64)	(48)	(12)	(16)		
Total C	42.4	42.9	42.8	42.9	1.14	0.774
Total N	4.2	3.5	3.3	2.8	0.21	<0.001
C:N ratio	10.3	12.4	12.9	15.7	0.67	<0.001

Table 2. Effect of height of cutting on total C and total N content of herbage and C:N ratio.

	HEIGHT OF CUT (MM)		s.e.d.	<i>P</i>
	50	100		
No. of samples	(56)	(84)		
Total C	41.9	43.2	0.47	0.005
Total N	3.7	3.7	0.12	0.819
C:N ratio	11.8	12.1	0.42	0.511

Table 3. Effect of frequency of digestate application and cutting on pH, total N, P, K and Mg content of soil.

	FREQUENCY (WEEKS)				s.e.d.	<i>P</i>
	2	4	6	8		
No. of replicates	(2)	(3)	(1)	(2)		
pH	5.2	5.4	5.4	5.2	0.09	0.062
Total N (%m/m)	0.40	0.38	0.38	0.40	0.034	0.714
Total P (mg/l)	13.5	21.3	12.0	16.5	3.44	0.058
Total K (mg/l)	83.0	96.0	60.0	76.0	7.07	0.012
Total Mg (mg/l)	116.5	115.7	116.0	129.0	5.97	0.083

Table 4. Effect of digestate application on pH, total N, P, K and Mg content of soil.

	DIGESTATE APPLICATION		s.e.d.	<i>P</i>
	With	Without		
No. of replicates	1	7		
pH	5.4	5.3	0.12	0.321
Total N (%m/m)	0.40	0.39	0.024	0.736
Total P (mg/l)	24.0	16.0	3.75	0.077
Total K (mg/l)	96.0	81.4	14.13	0.342
Total Mg (mg/l)	118.0	119.4	7.85	0.862

Table 5. Effect of frequency of digestate application and cutting on herbage dry matter yield and dry matter content of herbage.

	FREQUENCY (WEEKS)				s.e.d.	<i>P</i>
	2	4	6	8		
No. of replicates	(8)	(12)	(4)	(8)		
Herbage yield (t.DM/ha)	8.54	6.89	8.16	6.88	1.341	0.201
Dry matter (%TS)	20.7	21.4	22.7	23.3	1.08	0.012

Table 6. Effect of height of cutting on herbage dry matter yield and dry matter content of herbage.

	HEIGHT OF CUT (MM)		s.e.d.	<i>P</i>
	50	100		
No. of samples	(12)	(20)		
Herbage yield (t.DM/ha)	8.64	6.75	0.734	0.017
Dry matter (%TS)	22.0	21.8	0.595	0.742

Appendix 2: IGER tables of treatment means and statistical analyses for 2004.
 Statistical analyses by GENSTAT version 6.

Table 1. Effect of frequency of digestate application and cutting on total P, K and S and WSC content of herbage (g/kg DM).

	Frequency (weeks)				s.e.d.	<i>P</i>	Sig.
	2	4	6	8			
Total P	4.8	4.8	5.0	3.9	0.55	0.022	*
Total K	30.3	27.6	32.5	26.5	3.82	0.167	NS
Total S	4.5	4.4	5.1	3.5	1.16	0.276	NS
Total WSC	56.0	80.2	61.9	79.6	40.11	0.663	NS

Table 2. Effect of cutting height on total P, K and S and WSC content of herbage (g/kg DM).

	Cutting height		s.e.d.	<i>P</i>	Sig.
	50mm	100mm			
Total P	4.6	4.7	0.46	0.724	NS
Total K	26.4	30.0	3.17	0.228	NS
Total S	4.0	4.5	0.96	0.816	NS
Total WSC	67.7	77.4	33.26	0.854	NS

Table 3. Effect of digestate application on total P, K and S and WSC content of herbage (g/kg DM).

	Digestate status		s.e.d.	<i>P</i>	Sig.
	With	Without			
Total P	4.5	4.9	0.46	0.636	NS
Total K	28.6	27.6	3.17	0.945	NS
Total S	4.2	4.6	0.96	0.542	NS
Total WSC	70.9	79.9	33.26	0.979	NS

Table 4. Effect of frequency of digestate application and cutting on herbage dry matter yield and dry matter content of herbage.

	Frequency (weeks)				s.e.d.	<i>P</i>	Sig.
	2	4	6	8			
Herbage yield (t.DM/ha)	6.47	5.63	5.72	7.38	1.027	0.059	NS
Dry matter (%TS)	25.8	28.6	25.5	28.4	1.14	<0.001	***

Table 5. Effect of height of cutting on herbage dry matter yield and dry matter content of herbage.

	Height of cut (mm)		s.e.d.	<i>P</i>	Sig.
	50	100			
Herbage yield (t.DM/ha)	7.60	5.11	0.514	<0.001	***
Dry matter (%TS)	28.4	27.0	0.57	0.020	*

Table 6. Effect of digestate application on herbage dry matter yield and dry matter content of herbage.

	Digestate status		s.e.d.	<i>P</i>	Sig.
	with	without			
Herbage Yield (t.DM/ha)	6.50	5.22	0.726	0.088	NS
Dry matter (%TS)	27.2	29.1	0.81	0.023	*

Table 7. Chemical analyses of liquid digestate for each date of application.

Date	pH	Total N	Total P	Total K	NH4-N	Total Mg	Total S	Total solids
		kg/m ³	kg/m ³	kg/m ³	kg/m ³	kg/m ³	kg/m ³	%
21-Oct	7.5	4.5	0.27	4.41	2.89	NA	NA	NA
03-Mar	7.9	3.8	0.15	3.99	2.92	NA	NA	NA
31-Mar	8.1	4.0	0.08	3.68	2.45	0.05	0.11	2.5
14-Apr	8.0	3.8	0.09	3.42	2.63	0.05	0.11	2.4
28-Apr	No sample							
12-May	8.0	4.3	0.41	2.73	2.08	0.38	0.24	4.0
26-May	7.7	3.8	0.13	4.01	2.47	0.06	0.14	3.4
09-Jun	7.7	4.2	0.32	4.00	2.42	0.25	0.21	4.7
23-Jun	7.8	3.4	0.14	3.44	2.21	0.08	0.13	2.9
07-Jul	8.1	3.6	0.17	3.36	2.35	0.09	0.14	2.9
21-Jul	8.1	3.5	0.14	3.12	1.96	0.06	0.12	2.6
04-Aug	No sample							
18-Aug	7.1	3.5	0.14	3.98	1.85	0.06	trace	3.7
01-Sep	8.1	4.1	0.50	4.14	1.20	0.40	0.25	5.1
15-Sep	8.3	3.0	0.11	3.10	1.36	0.08	0.11	2.1
29-Sep	7.6	2.7	0.12	4.13	1.48	0.05	0.12	3.3
13-Oct	7.7	2.9	0.14	3.91	1.75	0.06	0.13	3.3
27-Oct	7.6	2.6	0.13	3.94	1.12	0.05	0.12	5.5

Table 8. Digestate nutrient supply (kg/ha)

Treatment	Total N	Total P	Total K	NH4-N	Total Mg	Total S
	Kg/ha					
D	115.9	5.5	117.9	72.7	3.0	4.0
E	115.9	5.5	117.9	72.7	3.0	4.0
B	70.0	1.4	36.0	20.8	0.8	1.2
C	70.0	2.8	70.2	40.7	1.6	2.3
A	0	0	0	0	0	0
K	0	0	0	0	0	0
F	65.3	2.5	70.9	40.5	1.2	1.9
G	79.3	3.8	82.4	46.7	2.4	2.5
H	79.3	3.8	82.4	46.7	2.4	2.5
I	76.6	4.7	74.1	42.5	3.4	3.3
J	0	0	0	0	0	0

Table 9. Herbage yield, N input, total N offtake and N surplus (N input minus N offtake), total C offtake, N efficiency and C:N ratio for each treatment (small plots only).

Treatment	D	E	B	C	A	K	F	G	H	Significance				
										s.e.d*	Cut		Digestate #	Height x digestate \$
											Frequency §	Height †		
Herbage DM yield	5.36	7.25	5.07	7.47	3.72	5.86	5.72	5.83	8.91	0.890	0.019	<0.001	0.027	NS
	tonnes/ha													
N supplied in digestate	115.9	115.9	70.0	70.0	0	0	65.3	79.3	79.3	-	-	-	-	-
	kg/ha													
Herbage N offtake	179.6	235	139.2	200	106.5	158.6	140.3	137.6	173.3	26.03	0.008	0.006	0.055	NS
N surplus	-63.7	-119.1	-69.2	-130	-106.5	-158.6	-75	-58.3	-94	29.43	-	-	-	-
Herbage C offtake	3561	1923	2456	3762	1527	2288	1043	1303	1458	147.3	<0.001	<0.001	<0.001	0.015
	kg DM/kg N input													
N efficiency	46.2	62.6	72.5	106.7			87.6	73.5	112.3	12.18	<0.001	<0.001	-	-
C:N ratio	23:01	09:01	18:01	20:01	14:01	14:01	08:01	10:01	08:01	23:01	0.002	0.006	NS	NS

*, for treatment means ; §, 2, 4, 6 and 8 week frequencies; †, 2, 4 and 8 week frequencies only; #, only within 4 week frequency; \$, interaction between height and digestate, 4 week frequency only; NS, not significant

Tables of means

Table 10. Herbage yield (t DM/ha)

Frequency (weeks)	Height (mm)	Digestate	
		With	Without
2	50	7.25	-
2	100	5.36	-
4	50	7.47	5.86
4	100	5.08	3.72
6	50	-	-
6	100	5.72	-
8	50	8.91	-
8	100	5.83	-

Table 11. Total N offtake (kg/ha)

Frequency (weeks)	Height (mm)	Digestate	
		With	Without
2	50	235.0	-
2	100	179.5	-
4	50	200.0	158.6
4	100	139.2	106.5
6	50	-	-
6	100	140.3	-
8	50	173.3	-
8	100	137.6	-

Table 12. Total C offtake (kg/ha)

Frequency (weeks)	Height (mm)	Digestate	
		With	Without
2	50	1923	-
2	100	3561	-
4	50	3762	2288
4	100	2456	1527
6	50	-	-
6	100	1043	-
8	50	1458	-
8	100	1303	-

Table 13. N efficiency (kg DM/kg N input)

Frequency (weeks)	Height (mm)	Digestate	
		With	Without
2	50	62.58	-
2	100	46.23	-
4	50	106.67	-
4	100	72.47	-
6	50	-	-
6	100	87.60	-
8	50	112.30	-
8	100	73.50	-

Table 14. Effect of frequency of cutting and digestate application on various parameters

	Frequency (weeks)			
	2	4	6	8
Herbage yield (t DM/ha)	6.3	5.5	5.7	7.4
N offtake (kg/ha)	207	151	140	155
C offtake (kg/ha)	2742	2508	1043	1380
N surplus (kg/ha)	-91	-100	-75	-76
N efficiency (kg DM/kg N)	54	89	88	93
C:N ratio	16:1	17:1	8:1	9:1

Table 15. Effect of cutting height on various parameters

	Cutting height (mm)	
	50	100
Herbage yield (t DM/ha)	7.4	5.2
N offtake (kg/ha)	192	141
C offtake (kg/ha)	2358	1978
N surplus (kg/ha)	-114	-67
N efficiency (kg DM/kg N)	94	70
C:N ratio	13:1	14:1

Table 16. Effect of digestate application on various parameters

	Digestate	
	with	without
Herbage yield (t DM/ha)	6.5	4.8
N offtake (kg/ha)	172	133
C offtake (kg/ha)	2215	1908
N surplus (kg/ha)	-87	-
N efficiency (kg DM/kg N)	80	-
C:N ratio	14:1	

Table 17. Total and available nutrient contents for digestate, cattle and pig slurries and solid FYM and fertiliser requirements for grass.

	TOTAL N	AVAILABLE N	P ₂ O ₅	K ₂ O
			Kg/m ³	
Digestate nutrient content*	3.6	2.1	0.4	4.5
			Kg/ha	
Grass requirements:				
1 st cut	120		40	80
2 nd cut	100		25	100
All subsequent cuts	80		15	80
			Available nutrients (kg/m ³)	
		N	P ₂ O ₅	K ₂ O
Digestate		2.1	0.2	4.0
Pig slurry (4% DM)				
- In Spring		2.0	1.0	2.2
- In Summer		1.2	1.0	2.2
Cattle slurry (6% DM)				
- In Spring		1.0	0.6	1.1
- In Summer		0.6	0.6	1.1
			Available nutrients (kg/tonne)	
Cattle FYM (25% DM)				
- In Spring		1.2	2.1	7.2
- In Autumn		0.3	2.1	7.2
Pig FYM (25% DM)				
- In Spring		1.4	4.2	6.3
- In Autumn		0.7	4.2	4.5
			Total nutrients (kg/tonne)	
Pig FYM (25% DM)		7.0	7.0	5.0
Cattle FYM (25% DM)		6.0	3.5	8.0

* Based on overall average digestate analysis: 3.6 kg total N, 2.1 kg available N, 0.2 kg P and 3.7 kg K per m³.

Reference

ANON (2000). *Fertiliser Recommendations for Agricultural and Horticultural Crops*. Ministry of Agriculture Fisheries and Food, Reference Book 209. 7th Edition. London: The Stationery Office.