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81/R/CS/258 Liquid Fertiliser and Nitrification Inhibitors - Ryegrass

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81/R/CS/258

LIQUID FERTILISER AND NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to liquid fertilisers on the yield and nitrogen uptake of grass cut for silage - White Horse II.

Sponsors: F.V. Widdowson, A. Penny, G.A. Rodgers.

The second year, ryegrass.

For previous year see 80/R/G/1.

Design: 3 randomised blocks of 20 plots.

Whole plot dimensions: 2.44 x 12.2.

Treatments: All combinations of:-

1. N TIME Times of injecting aqueous urea and nitrification inhibitors (cumulative to previous year dates):

 6 NOV 6 November, 1980
 20 JAN 20 January, 1981
 2 APR 2 April

2. N INHIB Nitrification inhibitors, added to aqueous urea supplying 375 kg N:

 U3 O None in 1980 and 1981
 U3 N Nitrapyrin at 1.5 kg in 1980 and 1981
 U3(S2)E Sodium trithiocarbonate (rate equivalent to 10 kg carbon disulphide) in 1980. Etridiazole at 1.5 kg in 1981
 U3(S1P)D Sodium trithiocarbonate (rate equivalent to 5 kg carbon disulphide) plus potassium ethyl xanthate at 5 kg in 1980. Dicyandiamide at 10 kg in 1981
 U3 S2P Sodium trithiocarbonate (rate equivalent to 10 kg carbon disulphide) plus potassium ethyl xanthate at 5 kg in 1980 and 1981

plus five extra treatments

- | | |
|-------|--|
| EXTRA | 'Nitro-Chalk' dressings (kg N) (cumulative to 1980 dressings): |
| 0 | None |
| NC2 D | 250 divided equally between 3 application dates - 27 Mar, 1981, 4 June, 12 Aug |
| NC3 D | 375 divided equally between 3 application dates - 27 Mar, 1981, 4 June, 12 Aug |
| NC4 D | 500 divided equally between 3 application dates - 27 Mar, 1981, 4 June, 12 Aug |
| NC3 S | 375 as a single application on 27 Mar |

Basal applications: Manures (0:14:28) at 500 kg.

81/R/CS/258

Cultivations, etc.: - PK applied: 21 Nov, 1980. Cut: 3 June, 1981, 6 Aug, 4 Nov.

NOTE: Plants were sampled for ammonium nitrate contents and soils for urea and inhibitor contents, and for nitrifying bacteria.

1ST CUT (3/6/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB N TIME	U3 O	U3 N	U3(S2)E	U3(S1P)D	U3 S2P	MEAN
6 NOV	5.75	5.43	6.51	5.61	6.28	5.92
20 JAN	5.47	5.24	5.35	5.30	5.50	5.37
2 APR	4.26	4.28	4.51	4.39	4.49	4.39
MEAN	5.16	4.98	5.46	5.10	5.42	5.23

EXTRA	0	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.76	4.27	4.46	4.40	4.76	3.73

GRAND MEAN 4.85

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	N TIME	N INHIB	N TIME N INHIB & EXTRA
SED	0.332	0.149	0.192	0.332

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	38	0.407	8.4

81/R/CS/258
2ND CUT (6/8/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB N TIME	U3 O	U3 N	U3(S2)E	U3(S1P)D	U3 S2P	MEAN
6 NOV	1.06	1.74	1.39	1.24	1.29	1.34
20 JAN	1.60	2.21	2.12	1.70	1.98	1.92
2 APR	2.69	2.50	2.47	2.46	2.38	2.50
MEAN	1.78	2.15	2.00	1.80	1.88	1.92
EXTRA	0 0.19	NC2 D 2.28	NC3 D 2.72	NC4 D 2.62	NC3 S 2.71	MEAN 2.10

GRAND MEAN 1.97

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	N TIME	N INHIB	N TIME N INHIB & EXTRA
SED	0.254	0.114	0.147	0.254

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM BLOCK.WP	DF	SE	CV%
	38	0.311	15.8

3RD CUT (4/11/81) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB N TIME	U3 O	U3 N	U3(S2)E	U3(S1P)D	U3 S2P	MEAN
6 NOV	0.54	0.51	0.49	0.58	0.66	0.56
20 JAN	1.03	1.04	1.04	1.03	1.11	1.05
2 APR	0.61	0.82	0.77	0.54	0.54	0.66
MEAN	0.73	0.79	0.77	0.72	0.77	0.75
EXTRA	0 0.19	NC2 D 2.07	NC3 D 2.35	NC4 D 2.46	NC3 S 1.27	MEAN 1.67

GRAND MEAN 0.98

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	N TIME	N INHIB	N TIME N INHIB & EXTRA
SED	0.168	0.075	0.097	0.168

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM BLOCK.WP	DF	SE	CV%
	38	0.205	20.9

81/R/CS/258

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB N TIME	U3 O	U3 N	U3(S2)E	U3(S1P)D	U3 S2P	MEAN
6 NOV	7.35	7.68	8.39	7.43	8.22	7.82
20 JAN	8.10	8.49	8.52	8.03	8.58	8.35
2 APR	7.56	7.60	7.75	7.39	7.41	7.54
MEAN	7.67	7.93	8.22	7.62	8.07	7.90

EXTRA	0	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	1.14	8.62	9.53	9.48	8.74	7.50

GRAND MEAN 7.80

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	N TIME	N INHIB	N TIME N INHIB & EXTRA
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SED	0.410	0.183	0.237	0.410

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	38	0.502	6.4

1ST CUT MEAN DM% 16.7
 2ND CUT MEAN DM% 18.3
 3RD CUT MEAN DM% 26.9
 TOTAL OF 3 CUTS MEAN DM% 20.6

PLOT AREA HARVESTED 0.00093