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82/R/CS/272 Nitrification Inhibitors - Ryegrass

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82/R/CS/272

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to liquid and solid fertilizers on the yield and nitrogen uptake of grass cut for silage - Highfield Drive.

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

The first year, ryegrass.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 2.4 x 12.2.

Treatments: All combinations of:-

- | | |
|---------------|--|
| 1. N TIME(1) | Times of injecting aqueous urea and nitrification inhibitors: |
| 25 JAN | 25 January, 1982 |
| 22 MAR | 22 March |
| 2. N INHIB(1) | Nitrification inhibitors, added to injected aqueous urea supplying 375 kg N: |
| AU3 0 | None |
| AU3 ETR | Etridiazole at 1.5 kg |
| AU3 NIT | Nitrapyrin at 1.5 kg |

plus all combinations of:

- | | |
|---------------|---|
| 1. N TIME(2) | Times of broadcasting prilled urea treated with nitrification inhibitors: |
| 23 MAR | 23 March, 1982 |
| DIVIDED | Dressing divided equally between three dates, 23 March, 9 June, 22 July |
| 2. N INHIB(2) | Nitrification inhibitors, added to prilled urea supplying 375 kg N: |
| PU3 0 | None |
| PU3 DIC | Dicyandiamide at 56 kg |
| PU3 HYD | Hydroquinone at 5.0 kg |

plus six extra treatments

- | | |
|-------|---------------------------------|
| EXTRA | 'Nitro-Chalk' dressings (kg N): |
| 0 | None |
| NC3 S | 375 on 23 March, 1982 |

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Dressing divided equally between three dates 23 March,
9 June, 22 July

NC1 D	125
NC2 D	250
NC3 D	375
NC4 D	500

Basal applications: Manures: (0:14:28) at 780 kg.

Cultivations, etc.:— PK applied: 24 Nov, 1981. Cut: 1 June, 1982,
14 July, 19 Oct. Previous crops: S. barley undersown grass 1980,
grass 1981.

NOTES: (1) N in herbage was measured for each cut.
(2) Amounts of ammonia volatilised for soil were measured one month
after each treatment.
(3) Amounts of urea, ammonium and nitrate in soils were regularly
measured from January.

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1ST CUT (1/6/82) DRY MATTER TONNES/HECTARE

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

N INHIB(1) N TIME(1)	AU3 0	AU3 ETR	AU3 NIT	MEAN
25 JAN	6.74	6.50	6.58	6.61
22 MAR	6.16	5.95	6.35	6.16
MEAN	6.45	6.22	6.47	6.38

N INHIB(2) N TIME(2)	PU3 0	PU3 DIC	PU3 HYD	MEAN
23 MAR	5.94	6.49	5.87	6.10
DIVIDED	5.79	5.69	5.70	5.73
MEAN	5.87	6.09	5.79	5.91

EXTRA	0	NC3 S	NC1 D	NC2 D	NC3 D	NC4 D	MEAN
	2.24	5.98	4.58	5.62	6.23	6.12	5.13

GRAND MEAN 5.81

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

TABLE	EXTRA	N TIME(1)	N INHIB(1)	N TIME(2)
SED	0.245	0.142	0.174	0.142

TABLE	N INHIB(2)	N TIME(1) N INHIB(1)	N TIME(2) N INHIB(2)
SED	0.174	0.245	0.245

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.301	5.2

1ST CUT MEAN DM% 22.6

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2ND CUT (14/7/82) DRY MATTER TONNES/HECTARE

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

N INHIB(1) N TIME(1)	AU3 0	AU3 ETR	AU3 NIT	MEAN
25 JAN	2.07	1.94	2.08	2.03
22 MAR	2.43	2.53	2.20	2.38
MEAN	2.25	2.23	2.14	2.21

N INHIB(2) N TIME(2)	PU3 0	PU3 DIC	PU3 HYD	MEAN
23 MAR	1.51	1.16	1.44	1.37
DIVIDED	2.24	1.81	1.61	1.89
MEAN	1.88	1.48	1.52	1.63

EXTRA	0	NC3 S	NC1 D	NC2 D	NC3 D	NC4 D	MEAN
	0.13	2.15	0.70	1.66	2.05	2.29	1.49

GRAND MEAN 1.78

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

TABLE	EXTRA	N TIME(1)	N INHIB(1)	N TIME(2)
SED	0.162	0.093	0.114	0.093

TABLE	N INHIB(2)	N TIME(1) N INHIB(1)	N TIME(2) N INHIB(2)
SED	0.114	0.162	0.162

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.198	11.2

2ND CUT MEAN DM% 18.5

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3RD CUT (19/10/82) DRY MATTER TONNES/HECTARE

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

N INHIB(1)	AU3 0	AU3 ETR	AU3 NIT	MEAN
N TIME(1)				
25 JAN	0.69	0.94	0.77	0.80
22 MAR	1.10	1.47	1.05	1.21
MEAN	0.89	1.20	0.91	1.00

N INHIB(2)	PU3 0	PU3 DIC	PU3 HYD	MEAN
N TIME(2)				
23 MAR	0.62	0.84	0.71	0.73
DIVIDED	2.62	2.63	2.72	2.66
MEAN	1.62	1.73	1.71	1.69

EXTRA	0	NC3 S	NC1 D	NC2 D	NC3 D	NC4 D	MEAN
	0.25	1.11	1.39	2.17	2.58	2.39	1.65

GRAND MEAN 1.45

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

TABLE	EXTRA	N TIME(1)	N INHIB(1)	N TIME(2)

SED	0.159	0.092	0.112	0.092

TABLE	N INHIB(2)	N TIME(1)	N TIME(2)
	N INHIB(1)	N INHIB(1)	N INHIB(2)

SED	0.112	0.159	0.159

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.195	13.4
3RD CUT MEAN DM%	28.8		

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TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

N INHIB(1) N TIME(1)	AU3 0	AU3 ETR	AU3 NIT	MEAN
25 JAN	9.50	9.37	9.43	9.44
22 MAR	9.69	9.95	9.60	9.75
MEAN	9.60	9.66	9.51	9.59

N INHIB(2) N TIME(2)	PU3 0	PU3 DIC	PU3 HYD	MEAN
23 MAR	8.07	8.49	8.01	8.19
DIVIDED	10.66	10.13	10.03	10.27
MEAN	9.37	9.31	9.02	9.23

EXTRA	0	NC3 S	NC1 D	NC2 D	NC3 D	NC4 D	MEAN
	2.62	9.24	6.66	9.45	10.85	10.80	8.27

GRAND MEAN 9.03

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

TABLE	EXTRA	N TIME(1)	N INHIB(1)	N TIME(2)
SED	0.367	0.212	0.260	0.212

TABLE	N INHIB(2)	N TIME(1) N INHIB(1)	N TIME(2) N INHIB(2)
SED	0.260	0.367	0.367

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.450	5.0

TOTAL OF 3 CUTS MEAN DM% 23.3

PLOT AREA HARVESTED 0.00093