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77/R/CS/195 Aqueous Ammonia and Nitrification Inhibitors - Old Grass

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77/R/CS/195

AQUEOUS AMMONIA AND NITRIFICATION INHIBITORS

Object: To study the residual effects of adding a range of nitrification inhibitors to aqueous ammonia on the yield and nitrogen uptake of grass cut for silage - Bones Close.

Sponsors: J. Ashworth, G.G. Briggs, A. Penny.

The second year, old grass.

For previous year see 76/R/G/1.

Design: 2 randomised blocks of 24 plots split into 2.

Whole plot dimensions: 2.43 x 9.14.

Treatments: All combinations of:-

Whole plots

1. NI INHIB(76) Nitrification inhibitors added to aqueous ammonia applied at 375 kg N, as a single application in 1976, injection tines spaced 30 cm apart:

 CS2 Carbon disulphide
 NITRAPYR Nitrapyrin ('N-Serve')
2. NI RATE(76) Rates of nitrification inhibitors in 1976:

 1 1 (5 kg carbon disulphide; 0.5 kg nitrapyrin)
 2 2 (12.5 kg carbon disulphide; 1.25 kg nitrapyrin)
 3 3 (25 kg carbon disulphide; 2.5 kg nitrapyrin)
3. NI TIME(76) Times of applying aqueous ammonia and nitrification inhibitors:

 AUTUMN Autumn 1975
 SPRING Spring 1976

Sub plots

4. N PERCUT(77) Nitrogen fertiliser, 'Nitro-Chalk' per cut (kg N) in 1977:

 0
 83

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Plus all combinations of:-

Whole plots

- | | |
|-----------|---|
| 1. AA(76) | Aqueous ammonia applied as above, in 1976 only: |
| AQ/A | Alone, in autumn |
| AQ/S | Alone, in spring |
| AQ+CN1/A | With a mixture of carbon disulphide (12.5 kg) and nitrapyrin (0.5 kg) in autumn 1975 |
| AQ+CN2/A | With a mixture of carbon disulphide (12.5 kg) and nitrapyrin (1.25 kg) in autumn 1975 |
| AQ+AT1/S | With ammonium trithiocarbonate (4 kg) in spring 1976 |
| AQ+AT2/S | With ammonium trithiocarbonate (10 kg) in spring 1976 |
| AQ+AT3/S | With ammonium trithiocarbonate (20 kg) in spring 1976 |
| AQ+ST/A | With sodium trithiocarbonate (25 kg) in autumn 1975 |

Sub plots

- | | |
|-----------------|--|
| 2. N PERCUT(77) | Nitrogen fertiliser, 'Nitro-Chalk' per cut (kg N) in 1977: |
| 0 | |
| 83 | |

Plus all combinations of:-

Whole plots

- | | |
|-------------|---|
| 1. N PERCUT | Nitrogen fertiliser, 'Nitro-Chalk', per cut (kg N): |
| 83 | |
| 125 | |
| 167 | |

Sub plots

- | | |
|---------|-----------------------|
| 2. YEAR | Years of application: |
| 1976 | 1976 only |
| 1976 77 | 1976 and 1977 |

Plus one extra plot:-

- | | |
|-------|-------------------------|
| EXTRA | Untreated 1976 and 1977 |
| NONE | |

NOTE: Yields were only taken from the first cut in 1977.

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

Cultivations, etc.: PK applied: 9 Dec, 1976. 'Nitro-Chalk' applied: 10 Mar, 1977. Cut: 25 May.

NOTE: Crop samples were taken for N determinations.

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1ST AND ONLY CUT (25/5/77) DRY MATTER TONNES/HECTARE

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

NI RATE(76)	1	2	3	MEAN		
NI INHIB(76)						
CS2	4.84	4.77	4.34	4.65		
NITRAPYR	4.57	5.00	4.91	4.83		
MEAN	4.71	4.88	4.62	4.74		
NI TIME(76)	AUTUMN	SPRING	MEAN			
NI INHIB(76)						
CS2	4.72	4.57	4.65			
NITRAPYR	4.62	5.04	4.83			
MEAN	4.67	4.81	4.74			
NI TIME(76)	AUTUMN	SPRING	MEAN			
NI RATE(76)						
1	4.62	4.80	4.71			
2	4.73	5.03	4.88			
3	4.66	4.59	4.62			
MEAN	4.67	4.81	4.74			
N PERCUT(77)	0	83	MEAN			
NI INHIB(76)						
CS2	3.67	5.62	4.65			
NITRAPYR	4.04	5.62	4.83			
MEAN	3.85	5.62	4.74			
N PERCUT(77)	0	83	MEAN			
NI RATE(76)						
1	3.83	5.59	4.71			
2	3.94	5.83	4.88			
3	3.80	5.45	4.62			
MEAN	3.85	5.62	4.74			
N PERCUT(77)	0	83	MEAN			
NI TIME(76)						
AUTUMN	3.69	5.65	4.67			
SPRING	4.02	5.60	4.81			
MEAN	3.85	5.62	4.74			
NI RATE(76)	1		2		3	
NI TIME(76)	AUTUMN	SPRING	AUTUMN	SPRING	AUTUMN	SPRING
NI INHIB(76)						
CS2	4.77	4.91	4.79	4.74	4.61	4.07
NITRAPYR	4.47	4.68	4.67	5.33	4.71	5.11
NI RATE(76)	1		2		3	
N PERCUT(77)	0	83	0	83	0	83
NI INHIB(76)						
CS2	3.99	5.69	3.64	5.89	3.38	5.30
NITRAPYR	3.66	5.49	4.24	5.76	4.22	5.61

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

NI TIME(76)	AUTUMN		SPRING	
N PERCUT(77)	0	83	0	83
NI INHIB(76)				
CS2	3.61	5.84	3.74	5.41
NITRAPYR	3.78	5.45	4.29	5.78
NI TIME(76)	AUTUMN		SPRING	
N PERCUT(77)	0	83	0	83
NI RATE(76)				
1	3.68	5.55	3.97	5.62
2	3.81	5.66	4.07	6.00
3	3.59	5.73	4.01	5.17
	NI TIME(76)	AUTUMN		SPRING
NI INHIB(76)	N PERCUT(77)	0	83	0
	NI RATE(76)			83
CS2	1	3.88	5.66	4.11
	2	3.62	5.96	3.66
	3	3.32	5.90	3.45
NITRAPYR	1	3.49	5.45	3.83
	2	3.99	5.35	4.48
	3	3.86	5.56	4.57
N PERCUT(77)	0	83	MEAN	
AA(76)				
AQ/A	3.66	5.54	4.60	
AQ/S	3.11	4.83	3.97	
AQ+CN1/A	3.61	5.98	4.79	
AQ+CN2/A	3.87	5.91	4.89	
AQ+AT1/S	3.13	5.43	4.28	
AQ+AT2/S	3.26	5.27	4.27	
AQ+AT3/S	4.18	5.73	4.95	
AQ+ST/A	3.44	5.16	4.30	
MEAN	3.53	5.48	4.51	
N PERCUT	83	125	167	MEAN
YEAR				
1976	3.43	3.44	4.06	3.64
1976 77	5.46	5.45	5.94	5.61
MEAN	4.44	4.45	5.00	4.63
EXTRA NONE	2.81			
GRAND MEAN	4.57			

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

TABLE	NI INHIB(76)	NI RATE(76)	NI TIME(76)	N PERCUT(77)
SED	0.182	0.223	0.182	0.107 0.131*

TABLE	AA(76)	N PERCUT	YEAR	NI INHIB(76) NI RATE(76)
SED	0.445	0.445	0.214	0.315

TABLE	NI INHIB(76) NI TIME(76)	NI RATE(76) NI TIME(76)	NI INHIB(76) N PERCUT(77)	NI RATE(76) N PERCUT(77)
SED	0.257	0.315	0.211	0.258
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
	NI INHIB(76)		0.151	
	NI RATE(76)			0.186

TABLE	NI TIME(76) N PERCUT(77)	AA(76) NPERCUT(77)	N PERCUT YEAR	NI INHIB(76) NI RATE(76) NI TIME(76)
SED	0.211	0.517	0.517	0.445
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
	NI TIME(76)	0.151		
	AA(76)	0.371		
	N PERCUT		0.371	

TABLE	NI INHIB(76) NI RATE(76) N PERCUT(77)	NI INHIB(76) NI TIME(76) N PERCUT(77)	NI RATE(76) NI TIME(76) N PERCUT(77)	NI INHIB(76) NI RATE(76) NI TIME(76) N PERCUT(77)
SED	0.365	0.298	0.365	0.517
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
	NI INHIB(76).NI RATE(76)	0.262		
	NI INHIB(66).NI TIME(76)	0.214		
	NI RATE(76).NI TIME(76)		0.262	
	NI INHIB(76).NI RATE(76).NI TIME(76)			0.371

* USE ONLY WITH TABLES INVOLVING AA(76)

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

STRATUM	DF	SE	CV%
BLOCK.WP	23	0.445	9.7
BLOCK.WP.SP	23	0.371	8.1

1ST CUT MEAN DM% 21.6

SUB PLOT AREA HARVESTED 0.00048