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85/W/CS/304 Nitrification Inhibitors - Ley

Rothamsted Research

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85/W/CS/304

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to liquid and solid urea on the yield and nitrogen uptake of a ley - Woburn Stackyard II.

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

The second year, grass ley.

For previous year see 84/W/CS/304.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 12.2 x 2.4.

Treatments: All combinations of:-

1. INHIB I Inhibitor to injected aqueous urea (applied at 375 kg N):

O AQU3	None
NIT AQU3	Nitrapyrin at 1.5 kg
C+P AQU3	Carbon disulphide at 10 kg plus potassium ethyl xanthate at 5 kg

2. APP TIME Times of applying aqueous urea:

WINTER	30 Jan, 1985
SPRING	7 Mar

plus all combinations of:-

1. INHIB B Inhibitor to broadcast prilled urea (applied at 375 kg N):

O PU3	None
DIC PU3	Dicyandiamide at 56 kg
PHEN PU3	Phenylphosphorodiamidate at 8 kg

2. APP DIV Division of prilled urea:

DIVIDED	Dressing equally divided between 11 Mar, 12 July, 6 Sept
SINGLE	Single dressing on 11 Mar

plus six extra treatments:

EXTRA 'Nitro-Chalk' (26% N) dressings (kg N):

O	None
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Dressings equally divided between 11 Mar, 12 July, 6 Sept:

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

Single dressing on 11 Mar:

NC3 S	375
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85/W/CS/304

Basal applications: Manures: (0:18:36) at 470 kg. Weedkiller: Mecoprop at 2.1 kg in 250 l.

Cultivations, etc.: PK applied: 13 Mar, 1985. Weedkiller applied: 4 Nov. Cut: 2 July, 3 Sept, 12 Nov.

NOTES: (1) Estimates of ammonia losses were made in the fortnight after applying treatments. Soil samples were taken at intervals for ammonium and nitrate analyses.
(2) Plant samples were taken at each cut for estimates of total N and dry matter.

1ST CUT (2/7/85) DRY MATTER TONNES/HECTARE

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

APP TIME	WINTER	SPRING	MEAN
INHIB I			
0 AQU3	6.51	6.98	6.75
NIT AQU3	7.43	7.29	7.36
C+P AQU3	6.64	7.26	6.95
MEAN	6.86	7.18	7.02

APP DIV	DIVIDED	SINGLE	MEAN
INHIB B			
0 PU3	7.61	6.22	6.91
DIC PU3	7.11	7.24	7.17
PHEN PU3	6.89	6.71	6.80
MEAN	7.20	6.72	6.96

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	2.76	7.11	6.64	6.42	6.69	5.03	5.77

GRAND MEAN 6.58

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

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.848	0.490	0.490	0.600

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.600	0.848	0.848

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	1.039	15.8

1ST CUT MEAN DM% 22.7

85/W/CS/304

2ND CUT (3/9/85) DRY MATTER TONNES/HECTARE

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

APP TIME	WINTER	SPRING	MEAN
INHIB I			
O AQU3	3.69	4.28	3.98
NIT AQU3	3.75	4.57	4.16
C+P AQU3	3.87	3.95	3.91
MEAN	3.77	4.27	4.02

APP DIV	DIVIDED	SINGLE	MEAN
INHIB B			
O PU3	3.37	2.45	2.91
DIC PU3	3.45	2.81	3.13
PHEN PU3	3.59	3.71	3.65
MEAN	3.47	2.99	3.23

EXTRA	O	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.61	2.39	3.61	3.58	3.86	3.99	3.00

GRAND MEAN 3.42

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

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.243	0.140	0.140	0.172

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.172	0.243	0.243

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.298	8.7

2ND CUT MEAN DM% 16.4

85/W/CS/304

3RD CUT (12/11/85) DRY MATTER TONNES/HECTARE

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

APP TIME	WINTER	SPRING	MEAN
INHIB I			
O AQU3	0.79	1.34	1.07
NIT AQU3	0.91	1.26	1.09
C+P AQU3	1.07	1.39	1.23
MEAN	0.93	1.33	1.13

APP DIV	DIVIDED	SINGLE	MEAN
INHIB B			
O PU3	1.48	0.44	0.96
DIC PU3	1.47	0.51	0.99
PHEN PU3	1.84	0.94	1.39
MEAN	1.60	0.63	1.11

EXTRA	0	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.59	1.20	1.87	1.95	2.00	1.15	1.46

GRAND MEAN 1.23

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

TABLE	EXTRA	APP TIME	APP DIVN	INHIB I
SED	0.172	0.099	0.099	0.121

TABLE	INHIB B	APP TIME INHIB I	APP DIV INHIB B
SED	0.121	0.172	0.172

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	0.210	17.0

3RD CUT MEAN DM% 28.2

85/W/CS/304

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

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

APP TIME	WINTER	SPRING	MEAN
INHIB I			
O AQU3	10.99	12.60	11.80
NIT AQU3	12.09	13.12	12.61
C+P AQU3	11.58	12.60	12.09

MEAN	11.55	12.77	12.16
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APP DIV	DIVIDED	SINGLE	MEAN
INHIB B			
O PU3	12.46	9.11	10.79
DIC PU3	12.03	10.55	11.29
PHEN PU3	12.32	11.36	11.84

MEAN	12.27	10.34	11.31
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EXTRA	O	NC1 D	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	3.95	10.69	12.12	11.95	12.54	10.18	10.24

GRAND MEAN 11.24

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

TABLE	EXTRA	APP TIME	APP DIV	INHIB I
SED	0.976	0.563	0.563	0.690

TABLE	INHIB B	APP TIME INHIB I	APP DIVN INHIB B
SED	0.690	0.976	0.976

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

STRATUM	DF	SE	CV%
BLOCK.WP	34	1.195	10.6

TOTAL OF 3 CUTS MEAN DM% 22.4

PLOT AREA HARVESTED 0.00084