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80/R/G/1 Grass Liquid Fertiliser and Nitrification Inhibitors

Rothamsted Research

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80/R/G/1

GRASS

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.

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:

 22 NOV 22 November, 1979
 24 JAN 24 January, 1980
 24 MAR 24 March, 1980

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

 U3 0 None
 U3 NI Nitrapyrin at 1.5 kg
 U3 ST2 Sodium trithiocarbonate (rate equivalent to 10 kg carbon disulphide)
 U3 ST1+P Sodium trithiocarbonate (rate equivalent to 5 kg carbon disulphide) plus potassium ethyl xanthate at 5 kg
 U3 ST2+P Sodium trithiocarbonate (rate equivalent to 10 kg carbon disulphide) plus potassium ethyl xanthate at 5 kg

plus five extra treatments

- EXTRA 'Nitro-Chalk' dressings (kg N):
- 0 None
- NC2 D 250 divided equally between 3 application dates -
 10 Mar, 1980, 2 June, 28 July
- NC3 D 375 divided equally between 3 application dates -
 10 Mar, 1980, 2 June, 28 July
- NC4 D 500 divided equally between 3 application dates -
 10 Mar, 1980, 2 June, 28 July
- NC3 S 375 as a single application on 10 Mar

NOTE: For the combination N TIME 24 Mar and N INHIB U3 ST1+P, sodium trithiocarbonate was replaced by dicyandiamide at 15 kg.

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

Cultivations, etc.: - Topped: 21 Nov, 1979. Cut: 28 May 1980, 23 July, 23 Oct. Previous crops: W. oats 1978, grass 1979.

80/R/G/1

NOTE: Urea concentration in soil was measured within 14 days of injection. Nitrate and ammonium in soil were measured at 21 day intervals until early May. Nitrate in herbage was measured after the first cut.

1ST CUT (28/5/80) DRY MATTER TONNES/HECTARE

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

| N INHIB N TIME | U3 0 | U3 NI | U3 ST2 | U3 ST1+P | U3 ST2+P | MEAN |
|-------------------|------|-------|--------|----------|----------|------|
| 22 NOV | 5.27 | 5.85 | 5.78 | 5.73 | 5.89 | 5.71 |
| 24 JAN | 5.19 | 5.46 | 5.39 | 5.32 | 5.30 | 5.33 |
| 24 MAR | 4.23 | 4.17 | 4.26 | 4.11* | 4.37 | 4.23 |
| MEAN | 4.90 | 5.16 | 5.15 | 5.06* | 5.19 | 5.09 |

| EXTRA | 0 | NC2 D | NC3 D | NC4 D | NC3 S | MEAN |
|-------|------|-------|-------|-------|-------|------|
| | 0.70 | 3.42 | 4.45 | 4.04 | 5.31 | 3.58 |

GRAND MEAN 4.71

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

| TABLE | EXTRA | N TIME | N INHIB | N TIME N INHIB |
|-------|-------|--------|---------|-------------------|
| ----- | ----- | ----- | ----- | ----- |
| SED | 0.172 | 0.077 | 0.099 | 0.172 |

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

| STRATUM | DF | SE | CV% |
|----------|----|-------|-----|
| BLOCK.WP | 38 | 0.210 | 4.5 |

* SEE NOTE ON FIRST PAGE