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Yields of the Field Experiments 1977

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77/R/CS/205 Nitrification Inhibitors - Kale

Rothamsted Research

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77/R/CS/205

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to forms of liquid nitrogen fertilisers on nitrogen uptake and yield - West Barnfield II.

Sponsors: F.V. Widdowson, A. Penny, J. Ashworth.

The first year, kale.

Design: 3 randomised blocks of 24 plots.

Whole plot dimensions: 4.27 x 8.53.

Treatments: All combinations of:-

1. L N FORM Forms of liquid nitrogen fertiliser:
 AN+UR Ammonium nitrate + urea (26% N)
 UR Urea (19% N)
2. L N RATE Rates of nitrogen fertiliser (kg N):
 100
 200
3. NI INHIB Nitrification inhibitors added to liquid nitrogen fertiliser:
 NONE None
 NITRAPYR Nitrapyrin ('N-Serve') at 1 kg
 SOD TRI Sodium trithiocarbonate at 22 kg

plus twelve extra treatments given solid nitrogen fertiliser (kg N):

SOLID N

- | | |
|----------|--|
| BSL 100S | BSL (a urea condensation product) at 100 to seedbed |
| BSL 200S | BSL at 200 to seedbed |
| NC 50S | 'Nitro-Chalk' at 50 to seedbed |
| NC 100S | 'Nitro-Chalk' at 100 to seedbed |
| NC 100DE | 'Nitro-Chalk' at 100 divided equally between seedbed and top dressing |
| NC 100DU | 'Nitro-Chalk' at 100 divided unequally, one-quarter to seedbed, three-quarters top dressed |
| NC 150S | 'Nitro-Chalk' at 150 to seedbed |
| NC 200S | 'Nitro-Chalk' at 200 to seedbed |
| NC 200DE | 'Nitro-Chalk' at 200 divided equally between seedbed and top dressing |
| NC 200DU | 'Nitro-Chalk' at 200 divided unequally, one-quarter to seedbed, three-quarters top dressed |
| NC 250S | 'Nitro-Chalk' at 250 to seedbed |
| NC 300S | 'Nitro-Chalk' at 300 to seedbed |

- NOTES: (1) 'Nitro-Chalk' and BSL applied to seedbed: 19 Apr, 1977.
(2) 'Nitro-Chalk' top dressed: 8 July.
(3) Liquid nitrogen fertiliser injected, 10 cm deep with tines 30 cm apart, on 19 Apr.

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Basal applications: Manures: (0:20:20) at 1260 kg. Chalk at 7.5 t. Weedkiller: Desmetryne at 0.42 kg in 220 l.

Seed: Maris Kestrel, sown at 1.7 kg.

Cultivations, etc.:— Chalk applied: 1 Sept, 1976. Ploughed: 13 Sept. PK applied: 8 Apr, 1977. Spring-tine cultivated: 2 May. Power harrowed: 17 May. Sown: 18 May. Weedkiller applied: 8 July. Harvested by hand: 21 Nov. Previous crops: Barley 1975, wheat 1976.

NOTE: Crop samples were taken for N determinations.

FRESH WEIGHT TONNES/HECTARE

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

| | | | | | | |
|----------|------|----------|---------|------|----------|---------|
| L N RATE | 100 | 200 | MEAN | | | |
| L N FORM | | | | | | |
| AN+UR | 70.4 | 77.6 | 74.0 | | | |
| UR | 66.1 | 75.2 | 70.6 | | | |
| MEAN | 68.2 | 76.4 | 72.3 | | | |
| NI INHIB | NONE | NITRAPYR | SOD TRI | MEAN | | |
| L N FORM | | | | | | |
| AN+UR | 74.4 | 73.7 | 73.9 | 74.0 | | |
| UR | 71.7 | 70.0 | 70.1 | 70.6 | | |
| MEAN | 73.0 | 71.8 | 72.0 | 72.3 | | |
| NI INHIB | NONE | NITRAPYR | SOD TRI | MEAN | | |
| L N RATE | | | | | | |
| 100 | 68.3 | 68.4 | 68.0 | 68.2 | | |
| 200 | 77.8 | 75.3 | 76.1 | 76.4 | | |
| MEAN | 73.0 | 71.8 | 72.0 | 72.3 | | |
| L N RATE | 100 | | | 200 | | |
| NI INHIB | NONE | NITRAPYR | SOD TRI | NONE | NITRAPYR | SOD TRI |
| L N FORM | | | | | | |
| AN+UR | 71.2 | 70.4 | 69.5 | 77.6 | 76.9 | 78.3 |
| UR | 65.4 | 66.4 | 66.4 | 78.0 | 73.6 | 73.9 |
| SOLID N | | | | | | |
| BSL 100S | 69.2 | | | | | |
| BSL 200S | 71.2 | | | | | |
| NC 50S | 64.2 | | | | | |
| NC 100S | 77.2 | | | | | |
| NC 100DE | 66.2 | | | | | |
| NC 100DU | 69.6 | | | | | |
| NC 150S | 73.5 | | | | | |
| NC 200S | 72.9 | | | | | |
| NC 200DE | 77.7 | | | | | |
| NC 200DU | 74.9 | | | | | |
| NC 250S | 80.6 | | | | | |
| NC 300S | 80.1 | | | | | |
| MEAN | 73.1 | | | | | |

GRAND MEAN 72.7

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FRESH WEIGHT TONNES/HECTARE

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

| TABLE | SOLID N | L N FORM | L N RATE | NI INHIB |
|-------|----------------------|----------------------|----------------------|----------------------------------|
| SED | 3.03 | 1.24 | 1.24 | 1.52 |
| TABLE | L N FORM L N RATE | L N FORM NI INHIB | L N RATE NI INHIB | L N FORM L N RATE NI INHIB |
| SED | 1.75 | 2.14 | 2.14 | 3.03 |

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

| STRATUM | DF | SE | CV% |
|---------------------|---------|------|-----|
| BLOCK.WP | 46 | 3.71 | 5.1 |
| PLOT AREA HARVESTED | 0.00114 | | |