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77/R/CS/198 Nitrification Inhibitors - Maize

Rothamsted Research

Rothamsted Research (1978) *77/R/CS/198 Nitrification Inhibitors - Maize ; Yields Of The Field Experiments 1977*, pp 260 - 261 - DOI: <https://doi.org/10.23637/ERADOC-1-29>

77/R/CS/198

NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to aqueous urea/ammonium nitrate on the yield and nitrogen uptake of maize grown for forage - Long Hoos VI/VII 5.

Sponsors: J. Ashworth, A.J. Barnard.

The first year, forage maize.

Design: 3 randomised blocks of 10 plots split systematically into 2.

Whole plot dimensions: 4.57 x 9.14.

Treatments: All combinations of:-

Whole plots

1. N TREAT Nitrogen forms and rates, and nitrification inhibitors:

Aqueous urea/ammonium nitrate injected to seedbed (13 May) at 120 kg N:-

AQ3 -	Alone
AQ3 STC1	With sodium trithiocarbonate at 10 kg
AQ3 STC2	With sodium trithiocarbonate at 25 kg
AQ3 NIT1	With nitrapyrin ('N-Serve') at 0.5 kg
AQ3 NIT2	With nitrapyrin at 1.0 kg

'Nitro-Chalk' applied to seedbed (20 May) (kg N):-

NC1	40
NC2	80
NC3	120
NC4	160

'Nitro-Chalk' dressing divided (kg N):-

NC1+1+1 40 to seedbed (20 May), 40 in July (29 July), 40 at tasselling (30 Aug)

Sub plots

2. POPULATN Plant population:

100000
150000

Basal applications: Manures: (0:14:28) at 970 kg. Weedkiller: Atrazine at 1.7 kg in 220 l.

Seed: Caldera 535.

Cultivations, etc.: Deep-tine cultivated: 13 Sept, 1976. PK applied: 13 Dec. Ploughed: 28 Feb, 1977. Spring-tine cultivated: 17 May. Sown: 18 May. Weedkiller applied: 20 June. Harvested by hand: 2 Dec. Previous crops: Oats 1975, wheat 1976.

77/R/CS/198

- NOTES: (1) Assessments of plant populations were made after emergence and at harvest.
 (2) Estimates were made of numbers of plants infected by smut (*Ustilago maydis*) and stem rots (*Fusarium* spp.).
 (3) Determinations of N percentage in crop dry matter were made.

FORAGE DRY MATTER TONNES/HECTARE

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

POPULATN N TREAT	100000	150000	MEAN
AQ3 -	8.34	8.71	8.52
AQ3 STC1	7.98	8.86	8.42
AQ3 STC2	8.64	8.95	8.79
AQ3 NIT1	8.24	8.52	8.38
AQ3 NIT2	8.04	9.23	8.63
NC1	7.83	8.15	7.99
NC2	7.89	7.82	7.85
NC3	9.02	9.18	9.10
NC4	8.60	9.72	9.16
NC1+1+1	8.01	8.89	8.45
MEAN	8.26	8.80	8.53

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

TABLE	N TREAT	POPULATN	N TREAT POPULATN
SED	0.422	0.162	0.556
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF: N TREAT			0.512

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

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.517	6.1
BLOCK.WP.SP	20	0.626	7.3

MEAN DM% 24.3

SUB PLOT AREA HARVESTED 0.00059