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84/W/CS/293 Nitrification Inhibitors - W. Wheat

Rothamsted Research

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84/W/CS/293

NITRIFICATION INHIBITORS

Object: To study the effects of nitrification inhibitors on the yield and nitrogen uptake of w. wheat - Woburn The Pightle.

Sponsors: G.A. Rodgers, A. Penny.

The third year, w. wheat.

For previous years see 82/W/WW/3 and 83/W/CS/293.

Design: 2 randomised blocks of 21 plots.

Whole plot dimensions: 4.0 x 12.0.

Treatments, applied cumulatively to 1982 and 1983: All combinations of:-

1. I FORM Nitrification inhibitors applied just before final seedbed cultivations:

DICYANDI	Dicyandiamide
ETRIDIAZ	Etridiazole
NITRAPYR	Nitrapyrin

2. I RATE Rates of inhibitors:

SINGLE	Single (1.0 kg for etridiazole and nitrapyrin; 10.0 kg for dicyandiamide)
DOUBLE	Double (2.0 kg for etridiazole and nitrapyrin; 20.0 kg for dicyandiamide)

3. N RATE Rates of nitrogen fertilizer in spring (kg N) as 'Nitro-Chalk':

0
35
70

plus 3 extra treatments given nitrogen fertilizer in spring only (kg N) as 'Nitro-Chalk':

N RATE X
0
35
70

NOTE: Nitrification inhibitors were applied on 29 Sept, 1983.

Basal applications: Weedkillers: Paraquat at 0.5 kg ion in 250 l. Chlortoluron at 3.5 l in 250 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 2.0 l) in 250 l with the growth regulator and the prochloraz with carbendazim. Fungicides: Prochloraz at 0.40 kg with carbendazim at 0.15 kg in 250 l. Carbendazim at 0.15 kg with tridemorph at 0.38 kg and maneb at 1.6 kg in 250 l. Growth regulator: Chlormequat (as 'Power 3c' at 4.2 l). Insecticide: Pirimicarb at 0.14 kg in 250 l.

Seed: Avalon, sown at 200 kg.

84/W/CS/293

Cultivations, etc.:— Straw burnt: 30 Aug, 1983. Ploughed: 12 Sept.
 Paraquat applied: 26 Sept. Spring-tine cultivated, seed sown: 29 Sept.
 Chlortoluron applied: 4 Oct. N treatments applied: 16 Apr, 1984.
 'Brittox', prochloraz with carbendazim and growth regulator applied:
 17 Apr. Carbendazim with tridemorph and maneb applied: 21 June.
 Insecticide applied: 28 June. Combine harvested: 21 Aug.

- NOTES: (1) Soil samples were taken in October, then at intervals until April and again before harvest for ammonia and nitrate analyses.
 (2) Plant samples were taken in spring, July and at harvest for estimates of total N and dry matter.

GRAIN TONNES/HECTARE

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

I FORM N RATE	DICYANDI	ETRIDIAZ	NITRAPYR	MEAN
0	8.19	7.66	8.16	8.00
35	9.97	8.81	9.13	9.30
70	9.08	8.95	9.20	9.07
MEAN	9.08	8.47	8.83	8.79

I RATE N RATE	SINGLE	DOUBLE	MEAN
0	8.20	7.81	8.00
35	9.64	8.97	9.30
70	9.27	8.88	9.07
MEAN	9.03	8.55	8.79

I RATE I FORM	SINGLE	DOUBLE	MEAN
DICYANDI	9.08	9.07	9.08
ETRIDIAZ	8.87	8.08	8.47
NITRAPYR	9.15	8.51	8.83
MEAN	9.03	8.55	8.79

I FORM I RATE N RATE	DICYANDI SINGLE	ETRIDIAZ DOUBLE	ETRIDIAZ SINGLE	NITRAPYR DOUBLE	NITRAPYR SINGLE	DOUBLE
0	8.43	7.94	8.00	7.33	8.16	8.16
35	10.15	9.79	9.23	8.38	9.52	8.74
70	8.67	9.49	9.37	8.53	9.76	8.63

N RATE X	0	35	70	MEAN
	8.09	8.86	8.29	8.41

GRAND MEAN	8.74
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GRAIN TONNES/HECTARE

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

TABLE	N RATE X	N RATE	I FORM	I RATE
SED	0.764	0.312	0.312	0.255

TABLE	N RATE I FORM	N RATE I RATE	I FORM I RATE	N RATE I FORM I RATE & N RATE X
SED	0.540	0.441	0.441	0.764

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

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.764	8.7

GRAIN MEAN DM% 87.4

STRAW TONNES/HECTARE

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

I FORM N RATE	DICYANDI	ETRIDIAZ	NITRAPYR	MEAN
0	5.31	5.01	4.16	4.83
35	4.87	5.25	5.17	5.10
70	5.47	5.58	5.19	5.42
MEAN	5.22	5.28	4.84	5.11

I RATE N RATE	SINGLE	DOUBLE	MEAN
0	5.06	4.59	4.83
35	5.14	5.05	5.10
70	5.54	5.29	5.42
MEAN	5.25	4.98	5.11

I RATE I FORM	SINGLE	DOUBLE	MEAN
DICYANDI	5.08	5.35	5.22
ETRIDIAZ	5.68	4.88	5.28
NITRAPYR	4.98	4.70	4.84
MEAN	5.25	4.98	5.11

84/W/CS/293

STRAW TONNES/HECTARE

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

I FORM I RATE N RATE	DICYANDI		ETRIDIAZ		NITRAPYR		DOUBLE
	SINGLE	DOUBLE	SINGLE	DOUBLE	SINGLE	DOUBLE	
0	5.79	4.82	4.82	5.20	4.58	3.74	
35	4.28	5.45	6.04	4.47	5.10	5.23	
70	5.17	5.78	6.19	4.97	5.27	5.12	
N RATE X	0 5.25	35 5.00	70 5.02	MEAN 5.09			
GRAND MEAN	5.11						
STRAW MEAN DM%	90.2						
PLOT AREA HARVESTED	0.00244						