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75/ R/WW/6 - Rates & Times of N & K - Winter Wheat

Rothamsted Research

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75/R/WW/6

WINTER WHEAT

RATES AND TIMES OF N AND K

Object: To study the effects of a range of rates and times of applying nitrogen and potassium on the yield of wheat - Long Hoos III.

Sponsors: O. Talibudeen, A. Penny, M.B. Page.

Design: 2 randomised blocks of 2 plots split into 30.

Whole plot dimensions: 2.67 x 2.74.

Treatments: All combinations of:-

Whole plots: 1. Potassium	POTASH
None	-
Potassium nitrate added to urea treatments (growth stages 6,10,11.1) to give a K:N ratio of 1:10.	K
Sub plots: 2. Nitrogen rates and times (applied as 'Nitro-Chalk' at growth stage 2, as a 5% urea solution to later growth stages) kg N:	N

Growth stage

2		6		10		11.1		
Early tillering		Early stem extension		In boot		Grain filling		
30	+	30	+	0	+	0		11--
30	+	30	+	0	+	30		11-1
30	+	30	+	0	+	60		11-2
30	+	30	+	30	+	0		111-
30	+	30	+	30	+	30		1111
30	+	30	+	60	+	0		112-
30	+	90	+	0	+	0		13--
30	+	90	+	0	+	30		13-1
30	+	90	+	0	+	60		13-2
30	+	90	+	30	+	0		131-
30	+	90	+	30	+	30		1311
30	+	90	+	60	+	0		132-
90	+	30	+	0	+	0		31--
90	+	30	+	0	+	30		31-1
90	+	30	+	0	+	60		31-2
90	+	30	+	30	+	0		311-
90	+	30	+	30	+	30		3111
90	+	30	+	60	+	0		312-
90	+	90	+	0	+	0		33--
90	+	90	+	0	+	30		33-1
90	+	90	+	0	+	60		33-2
90	+	90	+	30	+	0		331-
90	+	90	+	30	+	30		3311
90	+	90	+	60	+	0		332-

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plus six extra sub plots per whole plot not given
POTASH but given N:

							EXTRA
0	+	0	+	0	+	0	----
30	+	0	+	0	+	0	1---
60	+	0	+	0	+	0	2---
90	+	0	+	0	+	0	3---
120	+	0	+	0	+	0	4---
180	+	0	+	0	+	0	6---

NOTE: 'Nitro-Chalk' applied: 21 Apr. Urea and potassium nitrate applied:
 21 May (stage 6), 18 June (stage 10), 16 July (stage 11.1).

Basal applications: Manures: (0:20:20) at 310 kg. Weedkillers: Ioxynil with
 mecoprop ('Actril C' at 5.6 l in 280 l).

Seed: Cappelle, sown at 200 kg.

Cultivations, etc.: Ploughed: 18 Oct, 1974. Rotary cultivated: 28 Nov.

Seed sown: 29 Nov. Weedkiller applied: 22 May, 1975. Cut by hand:
 18 Aug. Previous crops: Fallow 1973, winter oats 1974.

NOTE: Samples of grain and straw were taken at harvest for N determinations.

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WINTER WHEAT

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

POTASH N	-	K	MEAN
11--	3.46	3.58	3.52
11-1	3.58	3.78	3.68
11-2	3.27	3.56	3.42
111-	3.89	3.51	3.70
1111	3.87	3.75	3.81
112-	3.93	3.74	3.83
13--	3.79	3.99	3.89
13-1	4.25	4.10	4.17
13-2	4.08	4.30	4.19
131-	4.24	4.22	4.23
1311	4.36	4.33	4.34
132-	4.27	4.36	4.31
31--	4.74	4.90	4.82
31-1	5.21	5.02	5.12
31-2	5.21	5.29	5.25
311-	5.09	4.93	5.01
3111	5.16	5.09	5.12
312-	5.04	5.55	5.29
33--	4.87	5.43	5.15
33-1	5.23	5.42	5.33
33-2	5.60	5.51	5.55
331-	5.23	5.65	5.44
3311	5.35	5.27	5.31
332-	5.79	5.41	5.60
MEAN	4.56	4.61	4.59

NO POTASH APPLIED

N	----	1---	2---	3---	4---	6---	MEAN
	1.90	3.26	4.12	4.83	5.32	5.47	4.15
GRAND MEAN	4.50						

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

TABLE	N	POTASH*
		N
SED	0.222	0.314

*WITHIN THE SAME LEVEL OF POTASH ONLY

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

STRATUM	DF	SE	CV%
BLOCK.WP.SP	63	0.314	7.0
GRAIN MEAN DM%	86.1		

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WINTER WHEAT

STRAW TONNES/HECTARE

*** TABLES OF MEANS ***

POTASH	-	K	MEAN
N			
11--	4.38	4.78	4.58
11-1	4.61	4.70	4.66
11-2	4.21	4.50	4.36
111-	4.89	4.34	4.61
1111	4.82	4.64	4.73
112-	4.52	4.54	4.53
13--	4.70	4.84	4.77
13-1	4.51	4.86	4.69
13-2	5.25	4.95	5.10
131-	5.04	5.19	5.12
1311	4.85	5.30	5.08
132-	5.12	5.32	5.22
31--	6.08	6.32	6.20
31-1	6.70	6.36	6.53
31-2	6.70	6.92	6.81
311-	6.58	6.39	6.49
3111	6.69	6.67	6.68
312-	6.94	7.07	7.00
33--	6.16	6.92	6.54
33-1	6.78	7.19	6.99
33-2	7.26	6.93	7.10
331-	6.24	6.95	6.59
3311	6.56	6.64	6.60
332-	7.37	6.90	7.13
MEAN	5.71	5.80	5.75

NO POTASH APPLIED

N	----	1---	2---	3---	4---	6---	MEAN
	2.28	4.19	5.52	6.47	6.93	8.10	5.58
GRAND MEAN	5.72						

STRAW MEAN DM% 83.2

SUB PLOT AREA HARVESTED 0.00048