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Yields of the Field Experiments 1975

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75/ B&w/CS/149 - Liquid Fertilisers - Wheat

Rothamsted Research

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75/R/CS/149 and 75/W/CS/149

LIQUID FERTILISERS

Object: To study the residual effects of a range of rates and methods of applying liquid fertilisers to potatoes on the yield of winter wheat - Rothamsted (R), Geescroft and Woburn (W) Lansome III.

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

The second year, winter wheat.

For previous year see 75/R&W/CS/149.

Design: Single replicate of 72 plots in 3 blocks of 24 plots.

Whole plot dimensions: Geescroft (R): 4.27 x 15.2. Lansome III (W): 4.27 x 12.2.

Treatments: All combinations of:-

1. Form and method of applying fertiliser in 1974: APPLICN(74)

Granules, broadcast over the plough furrow	GB
Liquid fertiliser, sprayed onto the plough furrow	LS
Liquid fertiliser placed in bands on each side of the seed	LP
Liquid fertiliser divided, 2/3 onto the plough furrow, 1/3 placed on each side of the seed	LSP

2. Rate of nitrogen and phosphorus fertiliser in 1974 (kg N and kg P2O5): NP RATE(74)

188	N2 P2
282	N3 P3
377	N4 P4

3. Ratio of potassium rate to nitrogen and phosphorus rate in 1974: K RATIO(74)

N:P2O5:K2O = 1:1:1	1.0
N:P2O5:K2O = 1:1:1.5	1.5

4. Nitrogen fertiliser in 1975 (kg N): N 75

Rothamsted	Woburn	(R)	(W)
None	30	0	30
30	60	30	60
60	90	60	90

75/R/CS/149 and 75/W/CS/149

Basal applications:-

Geescroft (R): Weedkiller: Ioxynil at 0.52 kg and mecoprop at 1.6 kg in 220 l. Growth regulator: Chlormequat at 1.7 l in 220 l.

Fungicide: Benodanil at 1.1 kg in 450 l.

Lansome III (W): Weedkiller: Ioxynil 0.63 kg and mecoprop at 1.9 kg in 280 l. Growth regulator: Chlormequat at 1.7 l in 280 l.

Fungicide: Benodanil at 1.1 kg in 390 l.

Seed: Geescroft (R): Maris Templar, sown at 200 kg.

Lansome III (W): Maris Templar, sown at 200 kg.

Cultivations, etc.:-

Geescroft (R): Chisel ploughed twice: 21 Dec, 1974. Rotary harrowed, seed sown, spring-tine cultivated: 31 Dec. N applied: 24 Apr, 1975.

Weedkiller applied: 14 May. Growth regulator applied: 21 May.

Fungicide applied: 20 June. Combine harvested: 28 Aug.

Lansome III (W): Deep-tine cultivated twice: 31 Oct, 6 Nov, 1974. Spring-tine cultivated three times: 8 Nov, 25 Nov, 26 Nov. Seed sown:

4 Dec. N applied: 16 Apr, 1975. Harrowed: 22 Apr. Weedkiller and

growth regulator applied: 9 May. Fungicide applied: 25 June. Combine harvested: 15 Aug.

NOTES: (1) Grain samples were taken for determination of percentage N.

(2) Yields from three plots on W/CS/149 were lost, those with treatment combinations:

APPLICN(74)	NP RATE(74)	K RATIO(74)	N 75
GB	N4 P4	1.0	30
LS	N3 P3	1.5	30
LSP	N4 P4	1.5	90

Estimated values were used in the analysis.

75/R/CS/149 GEESCROFT(R)

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

NP RATE(74) APPLICN(74)	N2 P2	N3 P3	N4 P4	MEAN
GB	4.11	5.19	5.18	4.83
LS	4.66	5.00	5.44	5.03
LP	4.93	4.84	5.03	4.93
LSP	4.46	5.43	5.28	5.05
MEAN	4.54	5.11	5.23	4.96

K RATIO(74) APPLICN(74)	1.0	1.5	MEAN
GB	4.70	4.96	4.83
LS	4.93	5.14	5.03
LP	4.99	4.87	4.93
LSP	5.00	5.10	5.05
MEAN	4.91	5.02	4.96

K RATIO(74) NP RATE(74)	1.0	1.5	MEAN
N2 P2	4.40	4.68	4.54
N3 P3	4.92	5.31	5.11
N4 P4	5.40	5.07	5.23
MEAN	4.91	5.02	4.96

N 75 APPLICN(74)	0	30	60	MEAN
GB	4.23	5.36	4.89	4.83
LS	4.26	5.21	5.63	5.03
LP	4.12	4.96	5.71	4.93
LSP	4.34	4.94	5.88	5.05
MEAN	4.24	5.12	5.53	4.96

N 75 NP RATE(74)	0	30	60	MEAN
N2 P2	3.65	4.65	5.32	4.54
N3 P3	4.55	5.32	5.47	5.11
N4 P4	4.51	5.39	5.79	5.23
MEAN	4.24	5.12	5.53	4.96

N 75 K RATIO(74)	0	30	60	MEAN
1.0	4.00	5.16	5.55	4.91
1.5	4.47	5.08	5.50	5.02
MEAN	4.24	5.12	5.53	4.96

75/R/CS/149/GEESECROFT(R)

GRAIN TONNES /HECTARE

*** TABLES OF MEANS ***

NP RATE(74)	N2 P2		N3 P3		N4 P4	
K RATIO(74)	1.0	1.5	1.0	1.5	1.0	1.5
APPLICN(74)						
GB	4.03	4.15	4.81	5.57	5.20	5.15
LS	4.43	4.89	4.78	5.21	5.57	5.32
LP	4.74	5.12	4.78	4.89	5.45	4.61
LSP	4.37	4.55	5.29	5.57	5.35	5.20

APPLICN(74)	NP RATE(74)	N 75	0	30	60
GB	N2 P2		3.83	4.65	3.86
	N3 P3		4.75	5.49	5.33
	N4 P4		4.11	5.93	5.49
LS	N2 P2		3.64	4.67	5.67
	N3 P3		4.14	5.20	5.64
	N4 P4		4.99	5.77	5.57
LP	N2 P2		3.80	4.97	6.01
	N3 P3		4.08	5.15	5.29
	N4 P4		4.48	4.76	5.85
LSP	N2 P2		3.33	4.30	5.74
	N3 P3		5.24	5.42	5.62
	N4 P4		4.45	5.11	6.26

K RATIO(74)	1.0			1.5		
N 75	0	30	60	0	30	60
APPLICN(74)						
GB	3.99	5.32	4.78	4.47	5.40	5.00
LS	3.80	5.28	5.70	4.72	5.15	5.55
LP	4.16	5.02	5.80	4.09	4.90	5.63
LSP	4.06	5.03	5.92	4.62	4.86	5.83

K RATIO(74)	1.0			1.5		
N 75	0	30	60	0	30	60
NP RATE(74)						
N2 P2	3.35	4.56	5.30	3.95	4.74	5.35
N3 P3	4.07	5.32	5.36	5.04	5.32	5.58
N4 P4	4.58	5.61	6.00	4.44	5.18	5.59

75/R/CS/149 GEESECROFT (R)

GRAIN TONNES/HECTARE

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

TABLE	APPLICN(74)	NP RATE(74)	K RATIO(74)	N 75
SED	0.238	0.206	0.168	0.206

TABLE	APPLICN(74) NP RATE(74)	APPLICN(74) K RATIO(74)	NP RATE(74) K RATIO(74)	APPLICN(74) N 75
SED	0.412	0.337	0.292	0.412

TABLE	NP RATE(74) N 75	K RATIO(74) N 75	APPLICN(74) NP RATE(74) K RATIO(74)	APPLICN(74) NP RATE(74) N 75
SED	0.358	0.292	0.583	0.723

TABLE	APPLICN(74) K RATIO(74) N 75	NP RATE(74) K RATIO(74) N 75
SED	0.583	0.508

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

STRATUM	DF	SE	CV%
WP	10	0.714	14.4

GRAIN MEAN DM% 87.9

PLOT AREA HARVESTED 0.00434

75/W/CS/149 LANSOME III(W)

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

NP RATE(74) APPLICN(74)	N2 P2	N3 P3	N4 P4	MEAN
GB	4.43	4.94	5.63	5.00
LS	4.91	5.36	4.95	5.07
LP	4.61	5.23	5.40	5.08
LSP	4.60	5.06	4.94	4.87
MEAN	4.64	5.15	5.23	5.00

K RATIO(74) APPLICN(74)	1.0	1.5	MEAN
GB	5.27	4.73	5.00
LS	4.86	5.29	5.07
LP	5.06	5.10	5.08
LSP	4.94	4.79	4.87
MEAN	5.03	4.98	5.00

K RATIO(74) NP RATE(74)	1.0	1.5	MEAN
N2 P2	4.58	4.69	4.64
N3 P3	5.18	5.11	5.15
N4 P4	5.33	5.13	5.23
MEAN	5.03	4.98	5.00

N 75 APPLICN(74)	30	60	90	MEAN
GB	4.35	5.15	5.50	5.00
LS	4.25	5.50	5.47	5.07
LP	4.04	5.13	6.06	5.08
LSP	4.50	5.01	5.09	4.87
MEAN	4.29	5.20	5.53	5.00

N 75 NP RATE(74)	30	60	90	MEAN
N2 P2	3.54	4.97	5.40	4.64
N3 P3	4.55	5.25	5.64	5.15
N4 P4	4.77	5.38	5.55	5.23
MEAN	4.29	5.20	5.53	5.00

N 75 K RATIO(74)	30	60	90	MEAN
1.0	4.47	5.19	5.43	5.03
1.5	4.10	5.20	5.63	4.98
MEAN	4.29	5.20	5.53	5.00

75/W/CS/149 LANSOME III (W)

GRAIN TONNES/HECTARE

*** TABLES OF MEANS ***

NP RATE(74) K RATIO(74) APPLICN(74)	N2 P2	1.5	N3 P3	1.5	N4 P4	1.5
GB	4.59	4.26	5.34	4.54	5.88	5.38
LS	4.55	5.28	5.31	5.41	4.71	5.18
LP	4.70	4.52	5.10	5.35	5.36	5.44
LSP	4.49	4.71	4.98	5.14	5.35	4.53

APPLICN(74)	N 75 NP RATE(74)	30	60	90
GB	N2 P2	3.59	5.03	4.66
	N3 P3	3.85	5.42	5.55
	N4 P4	5.60	5.01	6.29
LS	N2 P2	3.90	5.16	5.67
	N3 P3	4.77	5.57	5.74
	N4 P4	4.08	5.78	4.98
LP	N2 P2	2.90	5.03	5.90
	N3 P3	4.79	5.14	5.75
	N4 P4	4.44	5.21	6.54
LSP	N2 P2	3.78	4.65	5.38
	N3 P3	4.77	4.88	5.53
	N4 P4	4.94	5.50	4.37

K RATIO(74) N 75 APPLICN(74)	1.0	30	60	90	1.5	30	60	90
GB	5.36	5.12	5.34	3.34	5.19	5.66		
LS	3.90	5.66	5.01	4.60	5.34	5.93		
LP	3.97	4.96	6.24	4.12	5.30	5.89		
LSP	4.65	5.04	5.13	4.34	4.98	5.05		

K RATIO(74) N 75 NP RATE(74)	1.0	30	60	90	1.5	30	60	90
N2 P2	3.86	4.79	5.10	3.22	5.15	5.70		
N3 P3	4.50	5.44	5.61	4.60	5.06	5.67		
N4 P4	5.05	5.36	5.57	4.48	5.40	5.52		

75/W/CS/149 LANSOME III (W)

GRAIN TONNES/HECTARE

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

TABLE	APPLICN(74)	NP RATE(74)	K RATIO(74)	N 75
SED	0.284	0.238	0.217	0.231

TABLE	APPLICN(74) NP RATE(74)	APPLICN(74) K RATIO(74)	NP RATE(74) K RATIO(74)	APPLICN(74) N 75
SED	0.487	0.399	0.346	0.576

TABLE	NP RATE(74) N 75	K RATIO(74) N 75	APPLICN(74) NP RATE(74) K RATIO(74)	APPLICN(74) NP RATE(74) N 75
SED	0.524	0.388	0.688	1.042

TABLE	APPLICN(74) K RATIO(74) N 75	NP RATE(74) K RATIO(74) N 75
SED	0.813	0.693

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

STRATUM	DF	SE	CV%
WP	7	0.793	15.8

GRAIN MEAN DM% 86.1

PLOT AREA HARVESTED 0.00347