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Yields of the Field Experiments 1976

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76/R/BK/1 Broadbalk - Wheat, Potatoes, Beans

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76/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous winter wheat. Since 1968 two three-year rotations have been included: potatoes, beans, wheat and fallow, wheat, wheat.

The 133rd year, wheat, potatoes, beans. The ninth year of the revised scheme.

For previous years see 'Details' 1967, Station Report for 1966, pp.229-231, Station Report for 1968, Part 2, 68/A/1(t) and 69-75/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00434
	1	0.00798
	5, 6 and 7	0.00659
	8 and 9	0.00694
Potatoes:	2	0.00659
Beans:	4	0.00741

Treatments:

Whole plots

PLOT		Fertilisers and organic manures:-	
	Plot	Treatments until 1967	Treatments from 1968
01DN2PK	01	-	D N2 P K
21DN2	21	D	D N2
22D	22	D	D
030	03	None	None
05MIN	05	P K Na Mg	P K (Na) Mg
06N1MIN	06	N1 P K Na Mg	N1 P K (Na) Mg
07N2MIN	07	N2 P K Na Mg	N2 P K (Na) Mg
08N3MIN	08	N3 P K Na Mg	N3 P K (Na) Mg
09N4MIN	09	N*1 P K Na Mg	N4 P K (Na) Mg
10N2	10	N2	N2
11N2P	11	N2 P	N2 P
12N2PNA	12	N2 P Na	N2 P Na
13N2PK	13	N2 P K	N2 P K
14N2PKMG	14	N2 P Mg	N2 P K Mg
15N3MIN	15	N2 P K Na Mg	N3 P K (Na) Mg
16N2MIN	16	N*2 P K Na Mg	N2 P K (Na) Mg
17N2MINH	17	+N2	N2 1/2(P K (Na) Mg)
18N2MINH	18	+ P K Na Mg	N2 1/2(P K (Na) Mg)
19C	19	C	C
20NKMg	20	N2 K Na Mg	N2 K (Na) Mg

+ Alternating

76/R/BK/1

N1, N2, N3, N4: 48, 96, 144, 192 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' from 1968).

P: 35 kg P as single superphosphate (triple superphosphate in 1974)

K: 90 kg K as sulphate of potash

Na: 55 kg Na as sulphate of soda

(Na): 16 kg Na as sulphate of soda until 1973

Mg: 30 kg Mg annually to Plot 14, 35 kg Mg every third year to other plots since 1974. All as kieserite since 1974, previously as sulphate of magnesia annually

D: Farmyard manure at 35 tonnes

C: Castor meal to supply 96 kg N

MIN: P K (Na) Mg

Strips of sub-plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing on strips of sub-plots.

From 1968, ten sub-plots were started with the following cropping:-

SECTION	1968	69	70	71	72	73	74	75	76
SC0/W25	Section 0 W (last fallowed 1951)	W	W	W	W	W	W	W	W
SC1/W10	Section 1 W (last fallowed 1966)	W	W	W	W	W	W	W	W
POTATOES	Section 2 BE	W	P	BE	W	P	BE	W	P
-	Section 3 W (fallowed 1967)	W	F	W	W	F	W	W	F
BEANS	Section 4 W (fallowed 1965)	P	BE	W	P	BE	W	P	BE
SC5/W1F	Section 5 W (fallowed 1965)	F	W	W	F	W	W	F	W
SC6/W2F	Section 6 F	W	W	F	W	W	F	W	W
SC7/W1BE	Section 7 P	BE	W	P	BE	W	P	BE	W
SC8/W4	Section 8* W (fallowed 1963)	W	W	W	F	W	W	W	W
SC9/W18	Section 9 W (last fallowed 1958)	W	W	W	W	W	W	W	W

W = wheat, P = potatoes, BE = beans, F = fallow

* No weedkillers

NOTE: For a fuller record of treatments see 'Details' etc.

Standard applications:

Winter wheat: Manures: Section 1: Chalk at 3.1 t. Weedkillers: Sections 0, 1 and 9: Glyphosate at 1.7 kg in 220 l. Sections 0, 1, 5, 6, 7 and 9: Terbutryne and related triazines ('Prebane' at 4.5 kg in 220 l). Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.6 l in 220 l). Insecticides: Pirimicarb at 0.14 kg in 220 l. Section 9 only: Dimethoate at 0.11 kg in 220 l.

Potatoes: Manures: Chalk at 3.1 t. Weedkillers: Linuron at 1.2 kg plus paraquat at 0.42 kg ion in 220 l. Fungicide: Mancozeb at 1.3 kg in 450 l. Insecticide: Pirimicarb at 0.14 kg in 450 l.

Fallow Section: Manures: Chalk at 3.1 t.

76/R/BK/1

Seed: Winter wheat: Cappelle, dressed with chlorfenvinphos, sown at 200 kg.
Potatoes: Pentland Crown.
Spring beans: Minden, sown at 220 kg.

Cultivations, etc.:-

ALL SECTIONS: Autumn fertilisers and castor meal applied: 30 Sept, 1975.

FYM applied: 9 Oct. Ploughed: 11 Oct.

CROPPED SECTIONS:

Winter wheat: Glyphosate applied: 24 Sept. Chalk applied: 29 Sept.

Rotary harrowed sections 5, 6, 7, 8 and 9, spring-tine cultivated and rotary harrowed twice sections 0 and 1: 14 Oct. Seed sown: 16 Oct.

'Prebane' applied: 18 Oct. N applied: 31 Mar, 1976. Dimethoate applied: 8 Apr. 'Banlene Plus' applied: 29 Apr. Pirimicarb-applied: 24 June. Combine harvested: 30 July.

Potatoes: Chalk applied: 29 Sept, 1975. Deep-tine cultivated: 9 Dec.

Spring-tine cultivated: 22 Mar, 1976. N applied: 25 Mar. Rotary cultivated and potatoes machine planted: 29 Mar. Grubbed: 30 Mar. Weedkillers applied: 5 May. Insecticide applied: 17 June. Grubbed and rotary ridged: 21 June. Fungicide applied: 28 July. Haulm mechanically destroyed: 13 Sept. Lifted: 24 Sept.

Spring beans: Deep-tine cultivated: 9 Dec, 1975. N applied: 27 Feb.

Heavy spring-tine cultivated: 3 Mar, 1976. Seed sown: 4 Mar.

Tractor hoed: 27 Apr, 25 May. Combine harvested: 20 July.

FALLOW SECTION: Chalk applied: 29 Sept, 1975. Deep-tine cultivated:

9 Dec. Spring-tine cultivated: 22 Mar, 1976, 20 July. Heavy spring-tine cultivated: 20 Apr, 11 June. Ploughed: 2 June, 8 July.

- NOTES: (1) On Section 9 extensive damage by larvae of the Crambid moth, *Agriphila straminella*, was caused to Plot 10. Other plots in this section were also affected but much less severely. Dimethoate was applied as a control measure.
- (2) All wheat sections suffered a massive invasion of cereal aphids which was controlled by pirimicarb.

76/R/BK/1

WHEAT

GRAIN TONNES/HECTARE

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

SECTION	SC7/W1BE	SC5/W1F	SC6/W2F	SC1/W10	SC9/W18	SC0/W25	SC8/W4	MEAN
PLOT								
01DN2PK	4.11	4.10	4.66	*	*	*	*	4.29
21DN2	3.86	4.06	4.21	4.46	3.43	4.58	2.73	3.91
22D	4.61	4.68	4.32	4.63	4.09	4.75	2.61	4.24
030	2.34	3.06	1.10	1.61	1.12	1.85	1.34	1.77
05MIN	2.05	3.22	1.17	1.48	1.77	2.00	1.55	1.89
06N1MIN	3.64	4.05	2.82	2.61	2.68	3.42	1.65	2.98
07N2MIN	4.25	4.38	4.01	3.72	3.21	3.92	1.75	3.61
08N3MIN	3.86	4.22	4.44	4.02	3.40	4.04	2.53	3.79
09N4MIN	3.82	3.78	4.33	4.30	4.01	4.04	3.08	3.91
10N2	3.10	3.97	3.49	2.52	0.65	1.86	2.02	2.52
11N2P	3.35	3.25	3.78	2.55	2.05	2.05	1.79	2.69
12N2PNA	3.85	3.32	3.97	3.15	2.64	3.13	1.82	3.13
13N2PK	4.18	4.25	4.11	4.04	3.50	3.96	2.21	3.75
14N2PKMG	4.58	4.21	4.05	4.01	3.48	3.77	2.20	3.76
15N3MIN	4.64	3.96	4.08	4.10	3.25	4.27	2.38	3.81
16N2MIN	4.22	4.22	4.10	3.57	3.61	3.66	1.93	3.62
17N2MINH	4.49	4.41	4.03	3.42	3.46	3.53	1.90	3.61
18N2MIN	4.57	4.22	4.22	3.14	3.46	3.49	2.15	3.61
19C	4.79	4.19	4.38	3.78	3.42	4.22	2.09	3.84
20NKMG	*	*	*	2.37	*	2.92	*	2.65

GRAIN MEAN DM% 87.7

STRAW TONNES/HECTARE

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

SECTION	SC7/W1BE	SC5/W1F	SC6/W2F	SC1/W10	SC9/W18	SC0/W25	SC8/W4	MEAN
PLOT								
01DN2PK	6.00	4.96	5.75	*	*	*	*	5.57
21DN2	5.90	5.97	6.02	6.05	5.36	5.60	4.75	5.66
22D	6.12	6.51	5.28	5.77	5.38	5.78	5.55	5.77
030	2.13	2.51	0.74	1.20	1.02	1.48	1.24	1.47
05MIN	1.95	3.68	0.99	1.14	1.51	1.47	1.34	1.73
06N1MIN	3.98	4.22	2.79	2.08	2.22	2.97	1.72	2.86
07N2MIN	4.70	5.21	3.84	3.63	3.36	3.83	2.93	3.93
08N3MIN	4.82	5.54	5.29	4.27	3.84	4.58	3.78	4.59
09N4MIN	5.01	4.88	5.56	4.66	4.98	4.72	4.74	4.94
10N2	2.35	3.75	2.89	2.06	0.63	1.64	1.91	2.17
11N2P	2.95	2.95	3.22	2.02	2.00	2.14	1.82	2.44
12N2PNA	3.66	3.35	3.89	2.92	2.41	2.89	2.24	3.05
13N2PK	3.81	4.08	3.69	4.12	3.79	4.16	2.88	3.79
14N2PKMG	3.49	3.96	3.81	3.71	3.03	4.13	2.00	3.45
15N3MIN	4.41	4.40	4.11	4.55	3.25	5.01	3.04	4.11
16N2MIN	3.52	4.31	3.62	3.35	3.02	3.77	2.93	3.50
17N2MINH	3.67	4.29	3.35	2.90	3.13	3.14	2.90	3.34
18N2MIN	4.25	3.94	4.08	2.65	3.36	3.16	2.79	3.46
19C	4.08	4.33	4.18	3.11	2.71	3.56	2.61	3.51
20NKMG	*	*	*	1.67	*	2.50	*	2.09

STRAW MEAN DM% 92.8

76/R/BK/1

PLOT	POTATOES		SPRING BEANS
	TOTAL TUBERS:	% WARE	GRAIN:
	TONNES/ HECTARE	3.81 CM (1.5 INCH) RIDDLE	TONNES/ HECTARE
01DN2PK	30.3	95.0	0.95
21DN2	36.6	95.4	1.10
22D	37.5	97.8	1.20
030	11.6	93.8	0.35
05MIN	18.7	96.9	0.86
06N1MIN	25.6	97.1	0.80
07N2MIN	30.6	97.8	0.97
08N3MIN	32.0	97.2	0.89
09N4MIN	29.2	96.5	1.03
10N2	10.6	91.1	0.32
11N2P	8.3	88.3	0.44
12N2PNA	10.5	90.7	0.21
13N2PK	22.4	96.9	1.20
14N2PKMG	22.4	94.8	0.97
15N3MIN	31.8	98.0	1.40
16N2MIN	27.9	96.5	1.34
17N2MINH	25.6	98.1	1.10
18N2MINH	25.6	97.9	1.24
19	15.6	95.0	0.68
MEAN DM%			82.4