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Yields of the Field Experiments 1980

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80/R/BK/1 Broadbalk

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80/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous w. wheat. From 1968 two three-year rotations were included: potatoes, beans, wheat and fallow, wheat, wheat. In 1979 the first rotation was changed to fallow, potatoes, w. wheat.

The 137th year, w. wheat. fallow, potatoes. The 13th year of the rotations.

For previous years see 'Details' 1967 & 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, and 74-79/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00434
	1	0.00798
	3,4,5 & 6	0.00659
	8 & 9	0.00694
Potatoes:	2	0.00659

Treatments:

Whole plots

PLOT	Fertilisers and organic manures:-			
	Plot	Treatments until 1967	Treatments from 1968	Changes from 1980
01DN2PK	01	-	D N2 P K	-
21DN2	21	D	D N2	-
22D	22	D	D	-
030	03	None	None	-
05F	05	P K Na Mg	P K (Na) Mg	-
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	-
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	-
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	-
09N4F	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	-
15N3F	15	N2 P K Na Mg	N3 P K (Na) Mg	-
16N2F	16	N*2 P K Na Mg	N2 P K (Na) Mg	-
17N1+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK (Na) Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N0+3 1/2(PK (Na) Mg)+
19C	19	C	C	-
20NKMg	20	N2 K Na Mg	N2 K (Na) Mg	-

(A) Alternating

+ To w. wheat only. Potatoes receive N3 1/2(PK (Na) Mg) on both plots 17 & 18.

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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' in spring from 1968).

N0+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn combine drilled + 144 kg N in spring.

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

F: P K (Na) Mg H: Half rate

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	77	78	79	80
SC0/W29	Section 0	W (F 1951)	W	W	W	W	W	W	W	W	W	W	W	W
SC1/W14	Section 1	W (F 1966)	W	W	W	W	W	W	W	W	W	W	W	W
POTATOES	Section 2	BE	W	P	BE	W	P	BE	W	P	BE	W	F	P
SC3/W1F	Section 3	W (F 1967)	W	F	W	W	F	W	W	F	W	W	F	W
SC4/W1P	Section 4	W (F 1965)	P	BE	W	P	BE	W	P	BE	W	P	P	W
SC5/W2F	Section 5	W (F 1965)	F	W	W	F	W	W	F	W	W	F	W	W
SC6/W3F	Section 6	F	W	W	F	W	W	F	W	W	F	W	W	W
-	Section 7	P	BE	W	P	BE	W	P	BE	W	P	BE	W	F
SC8/W8	Section 8*	W (F 1963)	W	W	W	F	W	W	W	W	W	W	W	W
SC9/W22	Section 9	W (F 1958)	W	W	W	W	W	W	W	W	W	W	W	W

W = w. wheat, P = potatoes, BE - s. beans, F = fallow

* No weedkillers

NOTES: (1) For a fuller record of treatments see 'Details' etc.

(2) Since autumn 1975 chalk is applied at 2.9 t each autumn to sets of Sections on a three-year cycle.
Year 1: Sections 1,2,3. Year 2: Sections 6,7,8 & 9.
Year 3: Sections 0,4,5. Chalk is applied to all plots of each section.

(3) On 12 Sept, 1979 glyphosate weedkiller was applied at 1.5 kg in 220 l to all plots on Section 9 and at 3.0 kg in 220 l to the following:

Plot	Section
03, 05	0, 1, 5, 6 and 7
06	0, 1, 6, 7
08	7
10, 18, 19	0, 1, 6
13, 14, 17	6
20	0, 1

Plots 05 and 06 on Section 9 received a second application of glyphosate (at 3.0 kg in 220 l) on the same day.

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Standard applications:

W. wheat: Manures: Sections 6, 8 and 9 only: Chalk at 2.9 t.
Weedkillers: (Not section 8) Chlortoluron at 5.6 kg in 220 l.
Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 5.0 l) in 250 l.
Fungicides: Triadimefon at 0.13 kg in 250 l. Insecticide:
Demeton-s-methyl at 0.24 kg in 250 l. Omethoate (to section 3 only)
(as 'Folimat' at 1.1 l) in 220 l.
Potatoes: Weedkiller: Linuron at 1.1 kg in 900 l. Fungicide: Mancozeb
at 1.4 kg in 250 l applied on six occasions, with pirimicarb on the
first five. Insecticides: Phorate at 1.7 kg, at planting.
Pirimicarb at 0.14 kg.
Fallow: Section 7: Chalk at 2.9 t.

Seed: W. wheat: Flanders, sown at 200 kg
Potatoes: Pentland Crown.

Cultivations, etc.:-

ALL SECTIONS: Chalk applied: 19 Sept, 1979. Sulphate of potash,
sulphate of soda, and kieserite applied: 24 Sept. Castor meal and
superphosphate applied: 25 Sept. FYM applied: 26 Sept. Ploughed: 27
Sept.

CROPPED SECTIONS: W. wheat: Rotary harrowed: 1 Oct. Sections 1 & 2
rotary harrowed again: 2 Oct. Seed sown: 4 Oct. Chlortoluron
applied: 8 Oct. 'Folimat' applied (Section 3 only): 29 Feb, 1980. N
and 'Banlene Plus' applied: 10 Apr. Fungicide applied: 3 June.
Demeton-s-methyl applied: 23 June. Combine harvested: 21 Aug.

Potatoes: Chisel ploughed: 25 Jan, 1980. Spring-tine cultivated,
N applied: 17 Apr. Spike rotary cultivated; potatoes planted: 18
Apr. Grubbed: 25 Apr. Rotary ridged: 2 May. Weedkiller applied: 19
May. Fungicide applied with pirimicarb: 18 June, 30 June, 11 July,
24 July, 5 Aug. Fungicide applied alone: 18 Aug. Haulm mechanically
destroyed: 28 Aug. Lifted: 4 Sept.

FALLOW: Chisel ploughed: 1 Feb, 1980. Heavy spring-tine cultivated:
21 Apr. Ploughed twice: 12 May, 17 June. Spring-tine cultivated
twice: 23 May, 19 June. Rotary harrowed: 1 Aug.

80/R/BK/1 WHEAT

GRAIN TONNES/HECTARE

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

SECTION PLOT	SC4/W1P	SC3/W1F	SC5/W2F	SC6/W3F	SC1/W14	SC9/W22	SC0/W29	SC8/W8	MEAN
01DN2PK	8.40	7.76	8.15	8.05	*	*	*	*	8.09
21DN2	8.46	8.18	8.21	8.48	8.44	8.16	8.35	3.84	7.77
22D	6.45	7.63	6.57	5.38	6.71	6.47	6.37	4.19	6.22
030	2.16	2.56	1.31	1.07	1.78	1.76	1.89	1.69	1.78
05F	2.43	2.96	1.30	1.11	1.49	1.91	2.10	3.02	2.04
06N1F	5.31	5.04	4.00	3.36	3.74	4.36	4.05	2.89	4.09
07N2F	7.35	6.89	6.51	5.85	6.25	6.24	5.89	2.73	5.96
08N3F	8.52	8.16	7.77	7.39	7.17	7.20	6.63	3.22	7.01
09N4F	8.81	8.03	8.11	7.93	7.56	7.63	7.13	3.97	7.40
10N2	4.60	3.62	5.83	4.22	3.69	2.75	4.20	2.18	3.88
11N2P	6.64	5.67	5.94	5.36	4.68	4.25	5.04	1.82	4.93
12N2PNA	6.80	6.18	5.96	5.69	5.35	4.96	5.46	1.67	5.26
13N2PK	7.10	6.79	6.11	5.96	5.84	6.32	5.70	2.61	5.80
14N2PKMG	7.52	7.11	6.07	5.97	6.13	3.77	5.90	2.64	5.64
15N3F	8.30	7.70	7.32	6.94	7.26	6.83	6.85	2.65	6.73
16N2F	7.07	6.70	6.15	5.81	5.69	5.91	5.68	1.96	5.62
17N1+3FH	8.23	7.89	7.50	6.92	6.63	6.89	6.55	1.68	6.54
18N0+3FH	7.78	7.57	7.25	6.61	6.01	6.67	6.35	2.02	6.28
19C	5.54	5.49	3.80	3.60	4.64	4.08	4.19	1.77	4.14
20NKM	*	*	*	*	4.12	*	4.04	*	4.08

GRAIN MEAN DM% 82.6

STRAW TONNES/HECTARE

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

SECTION PLOT	SC4/W1P	SC1/W14	MEAN
01DN2PK	8.06	*	8.06
21DN2	7.10	6.22	6.66
22D	6.43	5.76	6.10
030	1.46	1.28	1.37
05F	2.01	1.20	1.60
06N1F	4.19	2.19	3.19
07N2F	5.50	3.74	4.62
08N3F	6.17	4.71	5.44
09N4F	6.92	4.61	5.76
10N2	2.18	2.08	2.13
11N2P	3.67	2.62	3.14
12N2PNA	3.85	2.86	3.35
13N2PK	5.80	3.45	4.63
14N2PKMG	4.84	3.69	4.27
15N3F	6.59	4.68	5.64
16N2F	5.28	5.79	5.53
17N1+3FH	6.07	4.43	5.25
18N0+3FH	5.65	3.57	4.61
19C	3.94	2.00	2.97
20NKM	*	3.08	3.08

STRAW MEAN DM% 88.2

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POTATOES

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

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE	
		3.81 INCH)	CM(1.5 RIDDLE
01DN2PK	52.9		98.0
21DN2	59.7		96.1
22D	52.5		96.8
030	10.8		94.5
05F	23.0		93.7
06N1F	38.1		93.0
07N2F	48.3		96.5
08N3F	55.3		95.9
09N4F	50.7		96.9
10N2	10.8		92.5
11N2P	16.1		75.3
12N2PNA	18.5		76.3
13N2PK	35.4		93.5
14N2PKMG	41.2		94.5
15N3F	49.1		95.0
16N2F	42.5		94.2
17N3FH	40.6		96.7
18N3FH	40.9		97.9
19C	22.7		93.9