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# Numerical Results of the Field Experiments 1968

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## 68/A/1 Wheat and Three-course Rotation Broadbalk

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68/A/1.1

WHEAT AND THREE-COURSE ROTATION BROADBALK 1968

(BK)

The 125th year, 1st year of revised scheme

For history, treatments etc. see 'Details' 1967, Station Report for 1966, pp. 229-231 and Station Report for 1968, Part II.

Plots and sections:

The five sections created in 1926 are now all subdivided and renumbered (for details see below). Headlands adequate for turning tractors etc. separate all the new sections.

In 1968 a new plot was made, north of plot 2A. This is called plot 1 and runs the length of old sections II, III, IV only.

Cropping:

The cropping for 1968 - 1971 is as follows:-

Old section	IA	IB	II	III	IV	VA	VB
Last fallow	1951	1966	1967	1965	1964	1963	1958
New section	0	1	2 3	4 5	6 7	8	9
Crop in:							
1968	W	W	Be W	W W	F P	W	W
1969	W	W	W W	P F	W Be	W	W
1970	W	W	P F	Be W	W W	W	W
1971	W	W	Be W	W W	F P	W	W

(W = winter wheat, Be = spring beans, F = fallow, P = potatoes)

Sections 0, 1, 8, 9 will carry continuous wheat except when perennial weeds make a fallow necessary, but all four will not be fallowed in the same year. Sections 2, 4, 7 will continue in the 3-course rotation:

potatoes, spring beans, wheat.

Sections 3, 5, 6 will be cropped in a 3-year cycle:

fallow, wheat, wheat.

All sections carrying wheat will be sprayed as necessary to control weeds, except section 8 which (as hitherto) will receive no weedkiller sprays.

Section 00, soil fumigation to continuous winter wheat: In autumn 1967 a 10 ft length at the West end of every plot of section 0 was fumigated with methyl bromide at 870 lb. Resulting yields were compared with those from an adjoining 10 ft length which received normal treatments only. Both series of plots were harvested by small combine harvester.

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In 1968 simazine was applied to beans, no weedkiller was applied to potatoes.

Varieties in 1968:

Wheat: Cappelle Desprez  
Beans: Maris Bead (inoculated seed)  
Potatoes: Majestic.

Manuring:

- (a) Plot 1. The new plot 1, which has received no organic or mineral manures for many years, now receives farmyard manure plus N2PK (see below for details) each year, applied to all crops including fallow (no N to fallow).
- (b) Nitrogen fertilisers. Sulphate of ammonia and nitrate of soda are discontinued, 'Nitro-Chalk' 21 being used instead. It is all applied at one time in spring.

For wheat it is applied as a top-dressing, for potatoes before rotary cultivation, for beans to the seedbed. No 'Nitro-Chalk' to fallow.

Rates of N are unchanged except on plots 2A, 9, 15 (for details see below).

The rates and symbols are (1b N), 43 (N1), 86 (N2), 129 (N3) and 172 (N4).

- (c) Organic manures. Farmyard manure (FYM) and castor bean meal are applied as hitherto, except that organics are now applied to the fallow section.

Symbol:

D: 14 tons FYM.  
R: Castor meal supplying 86 lb N.

- (d) Mineral manures. Except on plots 17 and 18 (which now receive PKNaMg at half the standard rates each year) and plot 14 which now receives K in addition to PMg, rates and materials are unchanged:-

Symbol:

P: Superphosphate supplying 30 lb P.  
K: Sulphate of potash supplying 80 lb K.  
Na: Sulphate of soda supplying 14 lb Na (except plot 12, 51 lb Na).  
Mg: Sulphate of magnesia supplying 10 lb Mg (except plot 14, 28 lb Mg).

All these are applied in autumn before ploughing. They are applied for all crops and fallow.

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Plot	Treatment till 1967	Treatment from 1968
1	-	DN2PK
2A	D	DN2
2B	D	D
3	None	None
5	PKNaMg	PKNaMg
6	N1PKNaMg	N1PKNaMg
7	N2PKNaMg	N2PKNaMg
8	N3PKNaMg	N3PKNaMg
9	N*1PKNaMg	N4PKNaMg
10	N2	N2
11	N2P	N2P
12	N2PNa	N2PNa
13	N2PK	N2PK
14	N2PMg	N2PKMg
15	N2**PKNaMg	N3PKNaMg
16	N*2PKNaMg	N2PKNaMg
17	N2	N2+1/2(PKNaMg)
18	PKNaMg alternating	N2+1/2(PKNaMg)
19	R	R
20	N2KNaMg	N2KNaMg

\*\* Formerly N in autumn.

NOTE: Plot 20 does not run the full length and is not included in the rotation scheme.

**Liming:**

Ground chalk was applied under the old scheme in autumn 1967, the following additional applications were made: (cwt chalk)

Plot	7	8	11	13	14	15
Section						
1	-	23	-	-	-	-
6,7	-	69	23	23	-	-
8	23	23	-	23	23	23
9	23	23	-	-	-	-

(remainder : none).

New scheme: Ground chalk will be applied in every third year, starting autumn 1970.

**Drilling and planting:**

Wheat: Because of the use of a new 15 row drill the plot widths for wheat have been reduced from 36 rows (21 ft) to 30 rows (17 ft 6 ins). Plot 1 has 30 rows. Plots 2A and 2B, originally 20 rows (11 ft 8 ins) each, now have 22 rows (12 ft 10 ins) each.

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Beans: 12 rows drilled (plot width 21 ft). Plot 1 has 12 rows.  
 Plots 2A and 2B each have 7 rows (12 ft 3 ins).  
 Potatoes: 8 rows are planted (plot width 18 ft 8 ins). Plot 1 has 8 rows. Plots 2A and 2B each have 5 rows (11 ft 8 ins).  
 The manures (with the exception of 'Nitro-Chalk') continue to be applied to the full 21 ft width for all crops. This applies also to plot 1. Dung is applied to plots 2A and 2B as though they were one plot, width 26 ft 3 ins. 'Nitro-Chalk' is applied to the drilled area for wheat, and to the full 21 ft width (13 ft on plot 2A) for beans and potatoes.

	Area of each plot:		Area harvested:
	2A and 2B	Remainder	All plots
Wheat: Section: 0	0.0147	0.0201	0.0107
1	0.0271	0.0370	0.0197
3, 4 and 5	0.0224	0.0305	0.0163
8 and 9	0.0236	0.0321	0.0171
Potatoes: Section: 7	0.0204	0.0326	0.0163
Beans: Section: 2	0.0214	0.0367	0.0153

Cultivations, etc.:

ALL SECTIONS: Ground chalk applied (including extra chalking): 11 Sept, 1967. FYM applied: 18 Sept. Plots 1 - 3 ploughed, all autumn fertiliser applied: 19 Sept. Remaining plots ploughed: 20 Sept.

CROPPED SECTIONS:

Winter wheat: Seed drilled at 180 lb: 7 Dec, 1967. 'Nitro-Chalk' applied (plot 20 omitted in error): 10 Apr, 1968. All sections except 8 and 9 sprayed with ioxynil at 9 oz and mecoprop at 27 oz in 20 gals: 4 May. Section 9 sprayed with ioxynil at 9 oz and mecoprop at 27 oz in 20 gals, section 5 resprayed with ioxynil at 7.5 oz and mecoprop at 22.5 oz in 20 gals and sections 0, 1, 3 and 4 resprayed with ioxynil at 6 oz and mecoprop at 18 oz in 20 gals: 6 May. The second spray was applied because of rain during spraying on 4th May. 'Nitro-Chalk' applied to plot 20: 17 June. Combine harvested: 26 Aug.

Potatoes: 'Nitro-Chalk' applied: 26 Mar, 1968. All plots rotary cultivated - first time: 28 Apr, second time: 29 Apr. Potatoes machine planted: 29 Apr. Grubbed: 20 May. Rotary ridged: 28 May. Grubbed and then rotary ridged: 19 June. Sprayed with mancozeb at 1.2 lb in 37 gals: 4 July. Sprayed with mancozeb at 1.2 lb and demeton-s-methyl at 3.5 oz in 37 gals: 19 July. Sprayed with mancozeb

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at 1.2 lb in 37 gals: 5 Aug. Sprayed with undiluted BOV  
at 20 gals: 31 Aug. Haulm destroyed mechanically: 13 Sept.  
Lifted: 19 Sept.

Spring beans: Seed drilled at 200 lb: 4 Mar, 1968. Sprayed  
with simazine at 1 lb in 33 gals: 5 Mar. 'Nitro-Chalk'  
applied: 26 Mar. 1.04 lb phorate applied in granules:  
22 June. Combine harvested: 6 Sept.

FALLOW SECTION: Ploughed second time: 28 May, 1968, third  
time: 5 Aug.

Area of each sub plot:	Area harvested: 0.0018
(Plots 2A and 2B): 0.0031	
(Remainder): 0.0046	

Cultivations to section 00: As section 0 except:- Rotary cultivated:  
21 Sept, 1967. Methyl bromide applied: 27 Sept. Combine harvested:  
25 Aug, 1968.

BROADBALK WILDERNESS: Cultivations, etc.:  
Ungrazed meadow (north): Topped with rotary grass cutter: 23 Jan, 1968.  
Grazed meadow (centre): Grazed by sheep: 2 - 10 May, 1968,  
27 - 31 May, 10 - 17 June, 8 - 17 July, 16 - 23 Aug,  
18 - 24 Sept, 10 - 16 Oct. Grass topped: 10 May, 18 June,  
18 July, 24 Aug, 18 Oct.

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SUMMARY OF RESULTS

WHEAT

GRAIN

Section Years after fallow	3	4	5	1	8	9	0	Mean
	1	3	3	2	5*	10	17	
Plot								
1	37.8	30.5	29.7					
2A	34.3	38.1	35.3	33.0	35.2	36.4	37.8	35.3
2B	38.8	29.0	30.1	25.2	32.8	34.9	31.3	32.2
3	15.0	10.2	10.4	8.3	17.0	11.6	11.5	12.3
5	22.9	12.8	13.8	8.5	17.5	13.9	14.4	15.2
6	28.6	22.8	21.3	15.9	31.7	24.9	21.0	23.9
7	31.3	29.2	29.6	24.3	27.3	31.1	29.5	28.8
8	22.8	31.5	28.8	27.9	30.4	31.7	29.4	28.5
9	27.2	33.2	31.9	30.4	33.1	30.6	30.1	30.6
10	8.3	18.7	17.6	16.1	21.2	16.2	9.4	14.8
11	6.1	19.6	15.4	21.3	13.8	14.9	16.8	14.7
12	4.4	20.0	19.1	23.5	12.6	13.0	22.4	15.8
13	13.7	27.1	26.2	26.4	16.1	27.7	26.1	22.7
14	15.2	27.9	24.0	26.7	24.9	30.1	25.4	24.4
15	20.7	30.3	31.4	28.1	31.4	32.3	25.3	28.2
16	21.3	25.8	24.5	23.7	29.6	30.4	20.2	24.9
17	27.4	29.9	20.3	22.2	37.9	32.7	27.1	29.6
18	25.9	25.9	23.1	23.2	39.8	32.4	23.5	28.0
19	22.7	20.0	19.0	15.3	24.6	15.9	18.3	19.3
20				8.1			9.6	8.8

Mean D.M. %: 83.6

\* No herbicide

% weed seeds plus rubbish

Plot 5, section 1: 8

Plot 8, section 0: 1

Plot 14, section 8: 3

Plot 16, section 0: 1

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Section Years after fallow	WHEAT				STRAW				Mean
	3 1	4 3	5 3	1 2	8 5*	9 10	0 17		
Plot									
1	52.3	22.0	33.9						
2A	50.8	50.2	42.8	48.0	60.9	39.0	42.1	47.3	
2B	38.5	30.1	31.1	24.1	43.0	34.2	27.8	33.1	
3	9.3	7.0	10.3	5.1	10.9	7.3	7.0	8.3	
5	18.3	11.5	9.3	6.8	23.0	11.2	11.2	13.3	
6	21.4	19.4	18.1	16.2	35.1	23.8	18.5	22.2	
7	30.8	31.0	33.0	27.3	45.1	36.4	33.4	34.3	
8	31.4	36.0	29.0	34.0	48.1	39.5	31.1	35.5	
9	32.7	34.2	28.2	31.7	44.2	35.8	28.8	33.6	
10	6.4	14.9	17.2	11.2	17.9	12.4	8.3	12.2	
11	12.9	13.9	11.4	19.6	24.3	16.9	14.8	16.6	
12	24.5	15.4	15.3	21.1	25.0	14.8	20.7	20.2	
13	24.5	26.6	25.3	30.5	42.3	31.2	27.5	30.2	
14	16.9	22.3	20.0	24.9	35.7	27.3	22.9	24.6	
15	28.8	27.7	25.4	29.1	46.6	32.6	27.2	31.6	
16	19.1	20.6	27.2	21.5	39.0	36.2	26.9	28.3	
17	25.1	29.2	28.4	22.5	42.1	30.9	25.9	29.1	
18	26.6	24.6	25.9	22.1	50.3	38.3	26.2	31.6	
19	18.8	17.4	14.3	11.6	31.4	18.5	15.4	18.3	
20				5.9			6.7	6.3	

Mean D.M. %: 69.5

\* No herbicide



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WHEAT

GRAIN

SECTION 00. FUMIGATED STRIPS

Plots	O	MB	Mean
2A	17.7	17.9	17.8
2B	23.8	18.6	21.2
3	11.8	16.4	14.1
5	12.1	16.2	14.1
6	21.1	24.2	22.6
7	28.0	27.9	27.9
8	23.9	20.8	22.3
9	22.3	21.9	22.1
10	12.7	9.9	11.3
11	19.3	20.7	20.0
12	22.9	20.6	21.7
13	21.3	20.6	20.9
14	21.0	23.0	22.0
15	23.5	22.4	22.9
16	13.9	19.3	16.6
17	23.1	23.5	23.3
18	20.3	25.5	22.9
19	14.2	19.1	16.7
Mean	19.6	20.5	20.0

Mean D.M. %: 81.6

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Section

2

7

Plots	SPRING BEANS		POTATOES	
	GRAIN	STRAW	TOTAL TUBERS	% WARE
1	25.5	11.2	13.77	97.7
2A	36.1	23.2	15.73	95.1
2B	42.0	30.8	13.16	94.7
3	10.6	7.2	4.05	93.2
5	32.0	21.1	4.35	91.3
6	34.3	22.8	8.26	93.7
7	36.8	23.5	12.38	96.2
8	37.0	23.1	14.68	94.9
9	35.5	18.5	13.75	97.1
10	6.0	5.4	2.95	88.2
11	3.9	5.2	3.06	77.1
12	4.4	7.3	3.33	82.1
13	27.7	17.1	9.15	94.2
14	16.0	11.6	6.38	93.5
15	31.2	17.9	11.53	93.5
16	28.9	19.7	10.99	95.8
17	28.1	14.6	10.05	95.4
18	26.6	13.0	9.67	96.0
19	20.0	14.5	8.19	95.6
Mean D.M. %:	70.3	76.4		