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79/R/BK/1 Broadbalk - Wheat, Potatoes

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79/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous winter 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, wheat.

The 136th year, wheat, fallow, potatoes. The 12th 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 74-78/R/BK/1.

Areas harvested:

Wheat:	Section	
	0	0.00434
	1	0.00798
	5, 6 & 7	0.00659
	8 & 9	0.00694
Potatoes:	4	0.00659

Treatments:

Whole plots

PLOT	Plot	Fertilisers and organic manures:-	
		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

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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' 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	77	78	79
SC0/W28	Section 0	W (F 1951)	W	W	W	W	W	W	W	W	W	W	W
SC1/W13	Section 1	W (F 1966)	W	W	W	W	W	W	W	W	W	W	W
-	Section 2	BE	W	P	BE	W	P	BE	W	P	BE	W	F
-	Section 3	W (F 1967)	W	F	W	W	F	W	W	F	W	W	F
POTATOES	Section 4	W (F 1965)	P	BE	W	P	BE	W	P	BE	W	P	P
SC5/W1F	Section 5	W (F 1965)	F	W	W	F	W	W	F	W	W	F	W
SC6/W2F	Section 6	F	W	W	F	W	W	F	W	W	F	W	W
SC7/W1BE	Section 7	P	BE	W	P	BE	W	P	BE	W	P	BE	W
SC8/W7	Section 8*	W (F 1963)	W	W	W	F	W	W	W	W	W	W	W
SC9/W21	Section 9	W (F 1958)	W	W	W	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 only: Chalk at 2.9 t. Weedkillers:

Glyphosate at 1.5 kg in 220 l (applied to sections 0, 1, 6 and 9 only).

Chlortoluron at 3.6 kg in 220 l to all wheat sections except 8. Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.2 kg in 220 l) to all wheat sections except 8. Fungicide: Triadimefon at 0.13 kg in 220 l.

Potatoes: Paraquat at 0.42 kg ion with linuron at 1.1 kg in 220 l. Fungicide: Mancozeb at 1.4 kg in 220 l applied on five occasions, with insecticide on the first three. Insecticide: Pirimicarb at 0.14 kg.

Fallow: Sections 2 & 3: Chalk at 2.9 t. Weedkillers: Glyphosate at 1.5 kg in 220 l.

NOTE: 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.

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

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Cultivations, etc.:-

ALL SECTIONS: Sulphate of potash, sulphate of soda, kieserite and castor meal applied: 2 Oct, 1978. Superphosphate applied: 3 Oct. FYM applied: 4 Oct. Ploughed: 5 Oct.

CROPPED SECTIONS: Wheat: Glyphosate applied: 22 Sept, 1978. Chalk applied: 3 Oct. Disc harrowed and rotary harrowed: 9 Oct. Seed sown: 10 Oct. Chlortoluron applied: 12 Oct. N applied: 3 May, 1979. 'Banlene Plus' applied: 9 May. Triadimefon applied: 27 June. Combine harvested: 28 Aug. Potatoes: Spring-tine cultivated: 1 May. N applied, spike rotary cultivated, potatoes planted: 14 May. Grubbed twice: 18 May and 3 July. Weedkillers applied: 30 May. Insecticide and fungicide applied: 26 June, 5 July, 20 July. Fungicide applied: 3 Aug and 15 Aug. Haulm pulverized: 4 Sept. Lifted: 14 Sept.

FALLOW SECTION: Chalk applied: 3 Oct. Spring-tine cultivated: 1 May. Ploughed twice: 23 May, 10 July. Heavy spring-tine cultivated twice: 14 June and 31 July.

POTATOES

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

PLOT	TOTAL TUBERS	% WARE
	TONNES/ HECTARE	3.81 CM(1.5 INCH) RIDDLE
01DN2PK	25.6	92.8
21DN2	29.7	95.6
22D	24.0	95.2
03O	6.1	84.7
05MIN	9.8	89.7
06N1MIN	18.7	86.5
07N2MIN	25.7	92.7
08N3MIN	30.0	91.4
09N4MIN	31.1	94.7
10N2	7.7	90.8
11N2P	7.9	80.3
12N2PNA	8.8	78.2
13N2PK	15.9	84.3
14N2PKMG	22.9	92.4
15N3MIN	30.0	93.8
16N2MIN	23.4	92.1
17N2MINH	20.6	93.7
18N2MINH	20.9	91.9
19C	13.5	93.5

79/R/BK/1 WHEAT

GRAIN TONNES/HECTARE

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

SECTION	SC7/W1BE	SC5/W1F	SC6/W2F	SC1/W13	SC9/W21	SC0/W28	SC8/W7	MEAN
PLOT								
01DN2PK	8.70	7.96	8.34	*	*	*	*	8.34
21DN2	8.27	8.31	8.34	7.31	7.92	6.64	4.06	7.26
22D	6.91	7.68	5.55	5.76	5.72	5.31	3.02	5.71
030	2.65	2.43	0.83	1.15	1.04	1.05	1.26	1.49
05MIN	3.58	2.33	0.83	1.03	1.35	1.54	1.99	1.81
06N1MIN	5.83	5.15	3.85	3.67	3.96	3.91	2.18	4.08
07N2MIN	7.08	7.22	6.35	5.83	6.04	5.94	3.13	5.94
08N3MIN	7.33	7.63	7.36	6.33	6.60	6.28	4.05	6.51
09N4MIN	7.60	7.41	7.77	7.02	7.31	6.63	5.07	6.97
10N2	4.63	4.61	4.18	2.28	2.04	2.80	2.09	3.23
11N2P	5.82	5.30	5.44	3.94	2.98	4.64	2.59	4.39
12N2PNA	6.28	5.87	6.04	5.14	4.61	5.49	2.55	5.14
13N2PK	6.70	6.30	6.12	6.13	6.04	5.77	3.89	5.85
14N2PKMG	6.99	6.70	6.43	6.67	6.27	6.25	3.60	6.13
15N3MIN	6.96	7.46	6.99	6.92	6.69	6.54	4.61	6.60
16N2MIN	6.74	6.74	6.04	5.84	6.34	5.72	4.07	5.93
17N2MINH	7.00	6.74	6.10	5.13	6.37	5.28	4.86	5.93
18N2MINH	7.21	6.94	6.37	5.34	6.54	5.58	4.52	6.07
19C	4.47	4.94	3.13	2.88	3.25	2.71	2.24	3.37
20NKMG	*	*	*	1.58	*	2.35	*	1.96

GRAIN MEAN DM% 83.4

STRAW TONNES/HECTARE

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

SECTION	SC7/W1BE	SC5/W1F	SC6/W2F	SC1/W13	SC9/W21	SC0/W28	SC8/W7	MEAN
PLOT								
01DN2PK	6.03	5.62	5.66	*	*	*	*	5.77
21DN2	6.55	6.18	5.73	5.20	5.71	4.17	5.17	5.53
22D	3.74	5.10	3.35	3.86	3.64	3.69	3.27	3.81
030	1.13	1.22	0.33	0.60	0.47	0.61	0.92	0.75
05MIN	1.78	1.31	0.33	0.53	0.62	0.49	1.94	1.00
06N1MIN	2.01	3.11	2.22	1.74	2.17	2.23	4.38	2.55
07N2MIN	4.60	4.58	3.80	3.40	3.91	3.70	3.97	4.00
08N3MIN	4.55	4.35	4.51	3.32	4.60	3.67	4.31	4.19
09N4MIN	5.10	4.36	5.24	4.45	4.42	4.74	4.28	4.66
10N2	2.02	2.04	2.07	1.19	1.02	1.48	2.40	1.75
11N2P	2.63	2.63	2.65	1.61	1.10	2.30	2.59	2.22
12N2PNA	2.93	3.13	3.21	2.05	2.26	3.43	3.05	2.87
13N2PK	4.26	4.56	3.90	3.97	4.35	4.38	4.62	4.29
14N2PKMG	3.93	4.30	4.13	3.76	4.19	3.92	4.18	4.06
15N3MIN	4.08	4.83	5.03	3.74	4.72	4.13	4.69	4.46
16N2MIN	4.30	4.30	3.86	3.62	4.09	3.42	4.09	3.95
17N2MINH	4.35	3.85	3.85	3.12	4.26	3.66	4.22	3.90
18N2MINH	4.86	4.68	3.98	3.24	4.07	3.66	4.22	4.10
19C	2.34	2.67	1.54	1.19	1.70	1.58	2.26	1.90
20NKMG	*	*	*	0.86	*	1.24	*	1.05

STRAW MEAN DM% 91.0