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Yields of the Field Experiments 1957

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57/R/CB/2 and 57/W/CB/2 Barley - N and Residual Dung N P K and Salt

Rothamsted Research

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57/Cb/2.1

BARLEY

Residual effects of dung, N, P, K and salt to sugar beet 1956 and direct effect of N - Rothamsted (R) Great Field II and Woburn (W) Butt Close 1957.

Design: Half replicate of 4×2^5 arranged in 4 blocks of 16 plots each, the identity being $d(20 - 10 - 5 + 0)npksN = 1$, with certain high order interactions confounded with block differences.

Area of each plot (acres): R - 0.0158; W - 0.0167. Area harvested:
R - 0.0134; W - 0.0141.

Treatments: All combinations of:-

Applied to sugar beet 1956

Dung: None; 5; 10; 20 tons per acre ploughed in.
N: None; 0.9 cwt N per acre as sulphate of ammonia.
P: None; 0.75 cwt P_2O_5 per acre as superphosphate.
K: None; 1.5 cwt K_2O per acre as muriate of potash.
Salt: None; 5 cwt per acre agricultural salt.

Applied to barley 1957

N: None; 0.4 cwt N as 'Nitro-Chalk' per acre.

Basal dressing (each field): 0.2 cwt P_2O_5 , 0.4 cwt K_2O as compound fertilizer (10% P_2O_5 , 20% K_2O) per acre.

Cultivations, etc.:

Great Field II (R). Ploughed: Jan 25. Seed combine drilled with basal fertilizers at 2 bushels per acre: Mar 26. Nitrogen fertilizer applied: Mar 28. Sprayed with MCPA at 2 pints in 40 gallons per acre: May 28. Combine harvested: Aug 20. Variety: Proctor. Previous crop: Sugar beet.

Butt Close (W). Ploughed: Jan 7. Nitrogen fertilizer applied: Mar 18. Seed combine drilled with basal fertilizer at $2\frac{1}{2}$ bushels per acre: Mar 19. Sprayed with MCPA at 2 pints in 20 gallons per acre: May 23. Combine harvested: Aug 20. Variety: Herta. Previous crop: Sugar beet.

Standard errors per plot, Grain (at 85% dry matter): cwt per acre.

Great Field (R): 1.79 cwt per acre or 4.8% (25 d.f.)*

Butt Close (W): 3.39 cwt per acre or 12.4% (27 d.f.)

*2 missing values.

Summary of Results

Grain (at 85% dry matter): cwt per acre

		Dung to sugar beet 1956: tons per acre				Mean
		None	5	10	20	
Great Field II, Rothamsted						
Mean	(±0.45)	35.7	37.0	37.6	38.9	37.3
<u>Applied to sugar beet 1956</u>						
N: cwt per acre						
None	(±0.63)	34.5	35.6	37.4	38.6	36.5
0.9		36.9	38.3	37.9	39.2	38.0
Difference	(±0.90)	+2.4	+2.7	+0.5	+0.6	+1.5 (±0.45)
P ₂ O ₅ : cwt per acre						
None	(±0.63)	35.0	35.8	36.7	38.2	36.4
0.75		36.4	38.1	38.6	39.5	38.1
Difference	(±0.90)	+1.4	+2.3	+1.9	+1.3	+1.7 (±0.45)
K ₂ O: cwt per acre						
None	(±0.63)	36.1	37.2	37.6	38.9	37.4
1.5		35.3	36.7	37.7	38.9	37.1
Difference	(±0.90)	-0.8	-0.5	+0.1	0.0	-0.3 (±0.45)
Salt: cwt per acre						
None	(±0.63)	34.6	36.8	37.9	38.9	37.1
5.0		36.7	37.2	37.4	38.8	37.5
Difference	(±0.90)	+2.1	+0.4	-0.5	-0.1	+0.4 (±0.45)
<u>Applied to barley 1957</u>						
N: cwt per acre						
None	(±0.63)	32.9	34.3	36.0	37.6	35.2
0.4		38.4	39.6	39.3	40.1	39.4
Difference	(±0.90)	+5.5	+5.3	+3.3	+2.5	+4.2 (±0.45)

		Responses to treatments cwt per acre									
		Applied to sugar beet 1956								Applied to barley 1957	
		N		P ₂ O ₅		K ₂ O		Salt		N	
Response to		None	0.9	None	0.75	None	1.5	None	5.0	None	0.4
<u>Applied to sugar beet 1956</u>		(±0.63)									
N		-	-	+1.6	+1.4	+1.3	+1.7	+1.7	+1.3	+3.4	-0.4
P ₂ O ₅		+1.8	+1.6	-	-	+2.1	+1.3	+2.6	+0.8	+1.8	+1.6
K ₂ O		-0.5	-0.1	+0.1	-0.7	-	-	-0.2	-0.4	-0.6	0.0
Salt		+0.7	+0.3	+1.4	-0.4	+0.6	+0.4	-	-	+0.4	+0.6
<u>Applied to barley 1957</u>											
N		+6.1	+2.3	+4.3	+4.1	+3.9	+4.5	+4.1	+4.3	-	-

Mean dry matter % as harvested: 83.5

57/Cb/2.3

Grain (at 85% dry matter): cwt per acre

		Dung to sugar beet 1956: tons per acre				Mean
		None	5	10	20	
Butt Close, Woburn						
Mean	(±0.85)	25.9	26.5	27.5	29.9	27.4
<u>Applied to sugar beet 1956</u>						
N: cwt per acre						
None	(±1.20)	25.7	26.2	29.7	30.4	28.0
0.9		26.1	26.9	25.3	29.3	26.9
Difference	(±1.70)	+0.4	+0.7	-4.4	-1.1	-1.1 (±0.85)
P ₂ O ₅ : cwt per acre						
None	(±1.20)	26.0	26.1	28.0	30.3	27.6
0.75		25.7	27.0	27.0	29.5	27.3
Difference	(±1.70)	-0.3	+0.9	-1.0	-0.8	-0.3 (±0.85)
K ₂ O: cwt per acre						
None	(±1.20)	26.7	26.4	28.7	30.3	28.0
1.5		25.0	26.7	26.3	29.4	26.8
Difference	(±1.70)	-1.7	+0.3	-2.4	-0.9	-1.2 (±0.85)
Salt: cwt per acre						
None	(±1.20)	26.4	25.2	28.5	29.5	27.4
5.0		25.4	27.8	26.5	30.2	27.5
Difference	(±1.70)	-1.0	+2.6	-2.0	+0.7	+0.1 (±0.85)
<u>Applied to barley 1957</u>						
N: cwt per acre						
None	(±1.20)	22.4	24.4	23.4	27.0	24.3
0.4		29.4	23.6	31.6	32.7	30.6
Difference	(±1.70)	+7.0	+4.2	+8.2	+5.7	+6.3 (±0.85)

Response to	Responses to treatments cwt per acre									
	Applied to sugar beet 1956								Applied to barley 1957	
	N	P ₂ O ₅		K ₂ O		Salt		N		
None	0.9	None	0.75	None	1.5	None	5.0	None	0.4	
<u>Applied to sugar beet 1956</u>	(±1.20)									
N	-	-	-0.3	-1.9	-0.8	-1.4	-1.2	-1.0	-1.0	-1.2
P ₂ O ₅	+0.5	-1.1	-	-	-0.6	0.0	+0.8	-1.4	-0.5	-0.1
K ₂ O	-0.9	-1.5	-1.5	-0.9	-	-	-0.1	-2.3	-0.7	-1.7
Salt	0.0	+0.2	+1.2	-1.0	+1.2	-1.0	-	-	-0.3	+0.5
<u>Applied to barley 1957</u>										
N	+6.4	+6.2	+6.1	+6.5	+6.8	+5.8	+5.9	+6.7	-	-

Mean dry matter % as harvested: 82.5