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58/R/CB/2 and 58/W/CB/2 Barley - N and Residual Dung N P K and Salt

Rothamsted Research

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58/Cb/2.1

BARLEY

Residual effects of dung, N, P, K and salt to sugar beet 1957 and direct effect of N - Rothamsted (R) West Barnfield II and Woburn (W) Great Hill 1958.

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 (each field): 0.0167 acres. Area harvested: 0.0141 acres.

Treatments: All combinations of:-

Applied to sugar beet 1957

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 agricultural salt per acre.

Applied to barley 1958

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

Basal dressing (each field): $2\frac{1}{2}$ cwt compound fertilizer (16% P_2O_5 , 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:

West Barnfield II (R). Ploughed: Jan 1. Seed combine drilled with basal fertilizers at 2 bushels per acre, nitrogen fertilizer applied: Mar 25. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 28. Combine harvested: Aug 27. Variety: Proctor. Previous crop: Sugar beet.

Great Hill (W). Ploughed: Jan 27. Nitrogen fertilizer applied, seed combine drilled at 3 bushels per acre with basal fertilizer: Apr 9. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 20. Combine harvested: Aug 26. Variety: Herta. Previous crop: Sugar beet.

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

West Barnfield II (R): 1.48 cwt per acre or 3.9% (27 d.f.)

Great Hill (W): 1.48 cwt per acre or 5.8% (27 d.f.)

58/Cb/2.2

Summary of Results

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

		Dung to sugar beet 1957: tons per acre									
		None	5	10	20	Mean					
<u>West Barnfield II (R)</u>											
Mean	(± 0.37)	36.4	37.6	37.8	38.8	37.7					
<u>Applied to sugar beet 1957</u>											
N: cwt per acre											
None		35.4	37.5	37.9	38.5	37.3					
0.9	(± 0.52)	37.4	37.8	37.7	39.1	38.0					
Difference	(± 0.74)	+2.0	+0.3	-0.2	+0.6	+0.7 (± 0.37)					
P ₂ O ₅ : cwt per acre											
None		36.0	37.4	37.1	38.1	37.1					
0.75	(± 0.52)	36.8	37.9	38.5	39.5	38.2					
Difference	(± 0.74)	+0.8	+0.5	+1.4	+1.4	+1.1 (± 0.37)					
K ₂ O: cwt per acre											
None		37.2	37.6	37.9	38.7	37.9					
1.5	(± 0.52)	35.7	37.6	37.7	38.9	37.5					
Difference	(± 0.74)	-1.5	0.0	-0.2	+0.2	-0.4 (± 0.37)					
Salt: cwt per acre											
None		36.6	37.7	38.1	38.8	37.8					
5.0	(± 0.52)	36.3	37.5	37.5	38.9	37.5					
Difference	(± 0.74)	-0.3	-0.2	-0.6	+0.1	-0.3 (± 0.37)					
<u>Applied to barley 1958</u>											
N: cwt per acre											
None		33.7	35.7	36.3	37.3	35.7					
0.4	(± 0.52)	39.1	39.5	39.4	40.4	39.6					
Difference	(± 0.74)	+5.4	+3.8	+3.1	+3.1	+3.9 (± 0.37)					
<u>Responses to treatments</u>											
cwt per acre											
<u>Applied to sugar beet 1957</u>											
<u>Applied to barley 1958</u>											
Response to	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 1957</u>							(±0.52)				
N	-	-	+1.3	+0.1	+1.1	+0.3	+1.1	+0.3	+2.1	-0.7	
P ₂ O ₅	+1.7	+0.5	-	-	+1.4	+0.8	+0.6	+1.6	+1.3	+0.9	
K ₂ O	0.0	-0.8	-0.1	-0.7	-	-	-0.2	-0.6	-0.3	-0.5	
Salt	+0.1	-0.7	-0.8	+0.2	-0.1	-0.5	-	-	-0.5	-0.1	
<u>Applied to barley 1958</u>											
N	+5.2	+2.4	+4.0	+3.6	+3.9	+3.7	+3.6	+4.0	-	-	
Mean dry matter % as harvested: 80.7											

58/Oh/2.3

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

		Dung to sugar beet 1957: tons per acre								
		None	5	10	20	Mean				
Great Hill (W)										
Mean	(±0.37)	25.0	25.6	26.0	25.5	25.5				
<u>Applied to sugar beet 1957</u>										
N: cwt per acre										
None	(±0.52)	24.4	25.2	25.9	25.5	25.3				
0.9		25.6	25.9	26.2	25.5	25.8				
Difference	(±0.74)	+1.2	+0.7	+0.3	0.0	+0.5 (±0.37)				
P ₂ O ₅ : cwt per acre										
None	(±0.52)	25.2	25.1	26.1	25.2	25.4				
0.75		24.8	26.1	26.0	25.8	25.7				
Difference	(±0.74)	-0.4	+1.0	-0.1	+0.6	+0.3 (±0.37)				
K ₂ O: cwt per acre										
None	(±0.52)	24.7	25.9	26.1	25.8	25.6				
1.5		25.2	25.2	26.0	25.3	25.4				
Difference	(±0.74)	+0.5	-0.7	-0.1	-0.5	-0.2 (±0.37)				
Salt: cwt per acre										
None	(±0.52)	24.6	26.0	25.7	25.3	25.4				
5.0		25.4	25.1	26.4	25.7	25.6				
Difference	(±0.74)	+0.8	-0.9	+0.7	+0.4	+0.2 (±0.37)				
<u>Applied to barley 1958</u>										
N: cwt per acre										
None	(±0.52)	19.4	19.8	20.4	19.8	19.8				
0.4		30.5	31.4	31.7	31.2	31.2				
Difference	(±0.74)	+11.1	+11.6	+11.3	+11.4	+11.4 (±0.37)				
Responses to treatments cwt per acre										
Applied to sugar beet 1957										
Applied to barley 1958										
Response to		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 1957</u>										
(±0.52)										
N	-	-	+0.1	+0.9	-0.3	+1.3	+0.6	+0.4	+0.9	+0.1
P ₂ O ₅	-0.1	+0.7	-	-	+0.6	0.0	+0.9	-0.3	+0.2	+0.4
K ₂ O	-1.0	+0.6	+0.1	-0.5	-	-	-0.2	-0.2	+0.4	-0.8
Salt	+0.3	+0.1	+0.8	-0.4	+0.2	+0.2	-	-	-0.2	+0.6
<u>Applied to barley 1958</u>										
N	+11.8	+11.0	+11.3	+11.5	+12.0	+10.8	+11.0	+11.8	-	-
Mean dry matter % as harvested: 80.0										