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Yields of the Field Experiments 1955

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55/R/BB/1 Deep Cultivation Rotation

Rothamsted Research

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DEEP CULTIVATION ROTATION EXPERIMENT

The 12th year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1955.

For details of rotation and treatments etc. see "Results of the Field Experiments 1939-47" Vol.I, Section Bc/1.

Area of each plot: 0.0312 acre. Area harvested: Sugar beet
($\frac{1}{2}$ plot) 0.0119 acre; barley, spring oats, 0.0265 acre;
ley, 0.0275 acre; wheat, 0.0188 acre; potatoes ($\frac{1}{2}$ plot), 0.0107 acre.

Cultivations, etc.:

Sugar beet

Fertilizers for ploughing in "deep" applied: Sept 27, 1954.
Dung to "deep" plots applied, ploughed all "deep" plots: Oct 22.
Dung and fertilizers for ploughing in "shallow" applied: Oct 22.
"Shallow" plots ploughed: Oct 29. Fertilizers for surface application applied: Apr 16, 1955. Seed drilled at 18 lb per acre: Apr 16. Sprayed with D.D.T. emulsion at 3 pints in 40 gallons per acre: June 13. Singled: June 21. Lifted: Nov 22. Variety: Klein E.

Barley

Ploughed: Jan 1, 1955. Ground chalk at 20 cwt per acre applied: Mar 18. Basic slag and sulphate of ammonia applied: Mar 21. Seed drilled at 3 bushels per acre: Mar 22. Harvested: Aug 8. Variety: Plumage Archer.

Ley

Seeds undersown in barley: Apr 21, 1954. Cut: July 11, 1955. Seeds mixture (per acre): 18 lb S.24 perennial ryegrass, 8 lb Montgomery red clover, 2 lb American Alsike clover.

Wheat

"Deep" plots ploughed: Oct 21, 1954. "Shallow" plots ploughed: Oct 27. Seed drilled at $2\frac{3}{4}$ bushels per acre: Dec 22. Sulphate of ammonia applied: May 13, 1955. Sprayed with M.C.P.A., medium volume, $2\frac{1}{2}$ pints per acre: May 31. Combine harvested: Aug 24. Variety: Yeoman.

Potatoes

Fertilizers for ploughing in "deep" applied: Sept 27, 1954. Dung to "deep" plots applied, ploughed all "deep" plots: Oct 22. Dung and fertilizers for ploughing in "shallow" applied: Oct 22. "Shallow" plots ploughed: Oct 29. Ridged: Apr 22, 1955. Fertilizers for surface application applied: Apr 27. Potatoes planted: Apr 28. Earthed up: July 4. Sprayed with sodium arsenite, 1 gallon in 80 gallons: Oct 10. Lifted: Oct 18. Variety: Majestic.

55/Bb/1.2

Spring oats

Ploughed: Nov 4, 1954. Ground chalk at 20 cwt per acre applied:
Mar 18, 1955. Sulphate of ammonia applied, seed drilled at
4 bushels per acre: Mar 21. Sprayed with M.C.P.A., high volume,
2 pints in 80 gallons: June 2. Harvested: Aug 4. Variety: Star.

Standard errors per plot:

Sugar beet, Total sugar.	Whole plot:	1.99 cwt per acre or 6.1%	(4 d.f.)
	Sub plot:	2.31 cwt per acre or 7.1%	(7 d.f.)
Tops.	Whole plot:	0.387 tons per acre or 4.9%	(4 d.f.)
	Sub plot:	0.553 tons per acre or 7.0%	(7 d.f.)
Barley, Grain:		2.27 cwt per acre or 7.1%	(4 d.f.)
Ley, Hay:		1.88 cwt per acre or 2.8%	(4 d.f.)
Wheat, Grain:		1.51 cwt per acre or 4.0%	(4 d.f.)
Potatoes, Total tubers.	Whole plot:	0.927 tons per acre or 13.3%	(4 d.f.)
	Sub plot:	0.389 tons per acre or 5.6%	(7 d.f.)
Spring Oats, Grain (at 85% D.M.):		2.21 cwt per acre or 5.8%	(4 d.f.)

Erratum to "Results of the Field Experiments" 1949, page 49/Bb/1.5.

Roots (washed): tons per acre, "Mean of Potash-None" should read
"8.93 not 8.03".

Summary of Results

Sugar Beet

Responses to treatments

Response to	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.

Roots (washed): Mean yield 10.05 tons per acre

Ploughing deep-shallow	+0.89	-	-	+1.07	+0.71	+0.31	+1.47	+0.77	+1.01
Dung	+5.18	+5.36	+5.00	-	-	+5.90	+4.46	+5.51	+4.85
Phosphate	+0.67	+0.09	+1.25	+1.39	-0.05	-	-	+0.71	+0.63
Potash	+0.53	+0.41	+0.65	+0.86	+0.20	+0.57	+0.49	-	-

Sugar Percentage: Mean 16.1

Ploughing deep-shallow	-0.1	-	-	-0.3	+0.1	-0.3	+0.1	-0.1	-0.1
Dung	+0.6	+0.4	+0.8	-	-	+0.7	+0.5	+0.9	+0.3
Phosphate	+0.3	+0.1	+0.5	+0.4	+0.2	-	-	+0.3	+0.3
Potash	0.0	0.0	0.0	+0.3	-0.3	0.0	0.0	-	-

Total Sugar: Mean yield 32.6 cwt per acre

(±1.00)

(±1.41)

Ploughing deep-shallow	+2.9	-	-	+3.1	+2.7	+0.4	+5.4	+2.3	+3.5
Dung	+17.9	+18.1	+17.7	-	-	+20.2	+15.6	+19.6	+16.2
Phosphate	+2.7	+0.2	+5.2	+5.0	+0.4	-	-	+3.0	+2.4
Potash	+1.6	+1.0	+2.2	+3.3	-0.1	+1.9	+1.3	-	-

Tops: Mean yield 7.86 tons per acre

(±0.193)

(±0.274)

Ploughing deep-shallow	+0.41	-	-	+0.26	+0.56	+0.25	+0.57	+0.55	+0.27
Dung	+2.92	+2.77	+3.07	-	-	+2.98	+2.86	+2.81	+3.03
Phosphate	+0.66	+0.50	+0.82	+0.72	+0.60	-	-	+0.91	+0.41
Potash	+0.43	+0.57	+0.29	+0.32	+0.54	+0.68	+0.18	-	-

Plant Number: Mean 28.7 thousands per acre

Ploughing deep-shallow	+0.4	-	-	+0.9	-0.1	+0.1	+0.7	+0.5	+0.3
Dung	+0.4	+0.9	-0.1	-	-	+0.5	+0.3	0.0	+0.8
Phosphate	-0.2	-0.5	+0.1	-0.1	-0.3	-	-	-0.3	-0.1
Potash	+0.1	+0.2	0.0	-0.3	+0.5	0.0	+0.2	-	-

55/Bb/1.4

Sugar Beet

	Phosphate			Potash			Mean
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	
Roots (washed): tons per acre							
Shallow	9.56	9.96	9.34	9.40	9.77	9.86	9.61
Deep	9.87	11.49	10.75	10.17	10.91	10.74	10.49
No dung	6.77	8.78	7.53	7.03	8.05	7.73	7.46
Dung	12.67	12.67	12.56	12.54	12.62	12.86	12.64
Mean	9.72	10.72	10.04	9.78	10.34	10.30	10.05

Sugar Percentage

Shallow	16.1	16.2	16.1	16.2	16.0	16.3	16.2
Deep	15.8	16.3	16.4	16.1	16.0	16.2	16.1
No dung	15.6	16.1	15.9	15.6	16.0	16.0	15.8
Dung	16.3	16.4	16.6	16.6	16.1	16.5	16.4
Mean	16.0	16.3	16.3	16.1	16.0	16.2	16.1

Total Sugar: cwt per acre

	(a)	(b) and (c)	(a)	(b) and (c)	
Shallow	31.1	32.3	30.2	30.7	31.2
Deep	31.5	37.8	35.6	33.0	35.2
No dung	21.2	28.3	23.9	22.0	25.9
Dung	41.4	41.7	41.9	41.7	40.6
Mean	31.3	35.0	32.9	31.8	33.2

Tops: tons per acre

	(a)	(b) and (c)	(a)	(b) and (c)	
Shallow	7.41	8.08	7.72	7.37	7.98
Deep	7.65	8.72	8.23	7.92	8.32
No dung	6.04	7.11	6.40	6.24	6.54
Dung	9.02	9.69	9.55	9.05	9.76
Mean	7.53	8.40	7.97	7.64	8.15

Plant Number: thousands per acre

Shallow	28.8	28.2	28.4	28.4	28.8	28.6	28.6
Deep	28.9	29.0	28.9	28.9	28.8	29.0	28.9
No dung	28.6	28.5	28.6	28.7	28.4	28.4	28.6
Dung	29.1	28.7	28.7	28.6	29.2	29.2	28.9
Mean	28.9	28.6	28.7	28.7	28.8	28.8	28.7

Total Sugar Tops

(a)	±1.00	±0.193	for use in comparisons other than horizontal
(b)	±1.16	±0.276	for use in horizontal comparisons
(c)	±1.29	±0.275	as (a).

Responses to treatments

Barley^{**}

Response to	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.

Grain: Mean yield 32.2 cwt per acre
(±1.13) (±1.60)

Ploughing deep-shallow	+0.5	-	-	+0.2	+0.8	+1.7	-0.7	+0.3	+0.7
Dung	+3.3	+3.0	+3.6	-	-	+3.1	+3.5	+3.2	+3.4
Phosphate	+2.9	+4.1	+1.7	+2.7	+3.1	-	-	+2.2	+3.6
Potash	+1.5	+1.3	+1.7	+1.4	+1.6	+0.8	+2.2	-	-

Straw: Mean yield 39.5 cwt per acre

Ploughing deep-shallow	+2.6	-	-	+0.5	+4.7	+3.1	+2.1	+2.5	+2.7
Dung	+6.6	+4.5	+8.7	-	-	+6.1	+7.1	+6.8	+6.4
Phosphate	+3.0	+3.5	+2.5	+2.5	+3.5	-	-	+2.3	+3.7
Potash	+3.7	+3.6	+3.8	+3.9	+3.5	+3.0	+4.4	-	-

Ley^{**}

Hay: Mean yield 68.3 cwt per acre

(±0.94) (±1.33)

Ploughing deep-shallow	+2.6	-	-	+2.4	+2.8	+3.9	+1.3	+1.7	+3.5
Dung	+6.5	+6.3	+6.7	-	-	+9.4	+3.6	+10.9	+2.1
Phosphate	+0.4	+1.7	-0.9	+3.3	-2.5	-	-	+0.6	+0.2
Potash	+0.4	-0.5	+1.3	+4.8	-4.0	+0.6	+0.2	-	-

Wheat^{*}

Grain: Mean yield 37.3 cwt per acre

(±0.75) (±1.07)

Ploughing deep-shallow	+3.2	-	-	+2.8	+3.6	+1.5	+4.9	+2.9	+3.5
Dung	+1.5	+1.1	+1.9	-	-	+1.7	+1.3	+0.8	+2.2
Phosphate	-0.6	-2.3	+1.1	-0.4	-0.8	-	-	0.0	-1.2
Potash	+0.6	+0.3	+0.9	-0.1	+1.3	+1.2	0.0	-	-

Potatoes

Total tubers: Mean yield 6.99 tons per acre

(±0.464) (±0.656)

Ploughing deep-shallow	+0.62	-	-	+0.50	+0.74	+0.43	+0.81	+0.96	+0.28
Dung	+3.10	+2.98	+3.22	-	-	+3.26	+2.94	+4.33	+1.87
Phosphate	+0.67	+0.48	+0.86	+0.83	+0.51	-	-	+0.29	+1.05
Potash	+1.73	+2.07	+1.39	+2.96	+0.50	+1.35	+2.11	-	-

Percentage ware (1½" riddle): Mean 82.8

Ploughing deep-shallow	+1.9	-	-	+3.2	+0.6	+1.5	+2.3	+4.5	-0.7
Dung	+7.2	+8.5	+5.9	-	-	+6.2	+8.2	+12.6	+1.8
Phosphate	-1.7	-2.1	-1.3	-2.7	-0.7	-	-	-2.9	-0.5
Potash	+4.8	+7.4	+2.2	+10.2	-0.6	+3.6	+6.0	-	-

*Cultivation treatments direct to wheat, manures to previous sugar beet.

**Treatments to previous Sugar beet.

55/Bb/1.6

Potatoes

	Phosphate			Potash			Mean
	None	Ploughed in	In ridges	None	Ploughed in	In ridges	
Total tubers: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	6.44	6.75	7.08	5.64	7.49	7.94	6.68
Deep	6.86	7.52	7.94	6.60	7.57	8.41	7.29
No dung	5.02	5.62	6.07	3.96	6.42	7.40	5.43
Dung	8.28	8.65	8.94	8.29	8.64	8.94	8.54
Mean	6.65	7.14	7.51	6.12	7.53	8.17	6.99

Percentage ware (1½" riddle)

Shallow	82.9	80.9	80.7	78.1	84.7	86.4	81.8
Deep	84.4	84.6	81.6	82.6	86.0	83.8	83.8
No dung	80.5	78.7	77.0	74.1	84.0	84.6	79.2
Dung	86.7	86.9	85.2	86.7	86.6	85.6	86.4
Mean	83.6	82.8	81.1	80.4	85.3	85.1	82.8

Spring Oats

Responses to treatments to previous potatoes

Response to	Mean	Ploughing		Dung		Phosphate		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.

Grain (at 85% D.M.): Mean yield 38.4 cwt per acre
(±1.11) (±1.57)

Ploughing deep-shallow	-2.3	-	-	-4.5	-0.1	-3.0	-1.6	-0.2	-4.4
Dung	+0.2	-2.0	+2.4	-	-	+0.3	+0.1	-1.5	+1.9
Phosphate	-0.4	-1.1	+0.3	-0.3	-0.5	-	-	+1.2	-2.0
Potash	+0.4	+2.5	-1.7	-1.3	+2.1	+2.0	-1.2	-	-

Total tubers

- (a) ±0.464 for use in comparisons other than horizontal
- (b) ±0.194 for use in horizontal comparisons
- (c) ±0.484 as (a).

Mean dry matter % as harvested

Barley, grain: Not recorded
Wheat, grain: 86.4
Spring oats, grain: 84.4