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51/BA/2 Four-course Rotation - Rothamsted

Rothamsted Research

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51/Ba/2.1

FOUR COURSE ROTATION EXPERIMENT

The 22nd year

Direct and residual effects of organics and phosphates - Hoosfield 1951.

For details of treatments and rotation see Appendix Z 1950.

Area of each plot: Potatoes: 0.0242 acre. Barley: 0.030.
Ryegrass and wheat: 0.0244 acre.

Manures (cwt per acre) applied 1950-51

Treatment	Organic fertilizers				Additional fertilizers		
	Organic matter	N	P ₂ O ₅	K ₂ O	N as Sulph. of amm.	P ₂ O ₅ as Super	K ₂ O as Mur. of potash
Dung	50 (as F.Y.M.)	1.514	0.566	1.121	0.286	0.634	1.879
Adco	50 (as Adco)	1.207	0.522	0.826	0.593	0.678	2.174
Straw	126 (as Straw)	0.992	0.290	1.614	0.808	0.910	1.386
Super			None		0.36	1.2	0.6
Rock			None		0.36	1.2 ²	0.6
Phosphate							

²As rock phosphate

Cultivations, etc.:

Potatoes: Ploughed: Aug 30. Dung and Adco applied: Jan 26. Supplementary fertilizers to dung and Adco and first two dressings to straw plots applied: Jan 30. Straw applied, all plots ploughed: Mar 5. Spring fertilizers, including third dressing to straw plots applied, ridged: May 9. Potatoes planted with dropper machine: May 10. Earthed up ridges: July 19. Sprayed with copper fungicide 5 lb per acre: Aug 14 and again Sept 8. Sprayed with 15% sulphuric acid: Sept 26. Lifted: Oct 9. Variety: Majestic.

Barley. Dung, Adco and supplementary fertilizers, and first two dressings to straw plots applied: Jan 30. Straw applied, all plots ploughed: Feb 7. Ground chalk 19 cwt per acre applied: Apr 5. Spring fertilizers and third dressing to straw plots applied, seed drilled at 3 bushels per acre: Apr 17. Harvested: Sept 10. Variety: Plumage Archer.

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Ryegrass. Dung, Adco and supplementary fertilizers, and first dressing to straw plots applied: Sept 14. Straw applied, all plots ploughed: Sept 18. Autumn fertilizers and second dressing to straw plots applied: Oct 12. Sulphate of ammonia and third dressing to straw plots applied: Apr 17. Seed sown at 70 lb per acre: Apr 19. Harvested: July 20. Variety: Western Wolths.

Wheat. Ploughed: Aug 5. Dung, Adco and supplementary fertilizers, and first dressing to straw plots applied: Sept 18. Straw applied, ploughed all plots: Sept 19. Autumn fertilizers applied: Oct 9. Seed drilled at 3 bushels per acre: Oct 18. Second dressing to straw plots applied: Jan 31. Sulphate of ammonia and third dressing to straw plots applied: May 9. Harvested: Aug 24. Variety: Squareheads Master 13/4.

51/Ba/2.3

Summary of Results

Manure +	Year of Cycle	Potatoes				Ware Mean	Resp. to Nitrogen	Barley		Ryegrass		Wheat	
		Total clean tubers, tons per acre	Resp. to Nitrogen	Percentage Additional N Without	Percentage Additional N With			Grain cwt per acre	Straw per acre	Dry matter cwt per acre	Grain cwt per acre	Straw per acre	
Manure as F.Y.M.	I	4.63	1.13	73.9	85.7	79.8	11.8	25.0	21.4	8.3	15.0	28.3	
	II	5.03	2.82	78.1	88.0	83.0	9.9	16.6	11.3	6.1	13.7	21.1	
	III	5.13	1.43	78.4	83.5	81.3	5.1	15.0	9.8	5.2	13.3	18.6	
	IV	4.01	0.86	78.4	84.6	81.5	6.2	12.1	7.9	5.7	11.5	14.7	
	V	4.67	1.05	77.8	83.5	80.6	5.7	15.3	11.6	5.8	12.9	17.3	
Manure as Adco (straw compost)	I	6.20	1.62	84.8	89.7	87.2	4.9	23.7	19.9	9.8	22.0	38.9	
	II	4.08	1.22	82.5	86.2	84.4	3.7	17.6	13.1	5.7	15.0	21.1	
	III	4.85	1.35	82.3	86.2	84.2	3.9	13.7	10.2	5.2	12.6	19.4	
	IV	4.87	-0.26	78.3	76.6	77.4	-1.7	14.8	11.2	7.2	12.3	16.5	
	V	3.34	0.40	74.6	77.6	76.1	3.0	9.7	7.2	5.2	12.6	17.7	
Manure as Straw	I	5.89	-0.65	79.3	81.4	80.4	2.1	24.6	18.0	7.0	18.0	26.6	
	II	4.99	2.00	76.3	82.0	79.2	5.7	17.8	12.8	2.3	15.4	23.5	
	III	4.99	0.00	81.0	80.8	80.9	-0.2	15.4	10.8	6.1	15.2	23.3	
	IV	4.71	1.08	78.4	79.6	79.0	1.2	12.5	9.6	7.4	12.0	15.7	
	V	4.59	1.00	79.8	84.2	82.0	4.4	15.7	11.0	4.7	12.6	16.9	
Super-phosphate	I	6.05	0.13	81.0	87.1	84.0	6.1	22.8	18.3	7.7	16.7	27.6	
	II	6.32	0.83	82.7	86.4	84.6	3.7	21.6	17.0	5.6	15.2	21.8	
	III	5.52	0.02	82.6	87.0	84.8	4.4	23.5	18.4	5.8	16.0	23.0	
	IV	5.76	1.54	80.3	89.9	85.1	9.6	18.7	14.6	4.2	16.5	25.5	
	V	4.40	2.32	82.8	89.3	86.0	6.5	20.8	18.1	5.9	16.3	24.0	
Rock phosphate	I	4.68	0.19	86.0	85.7	85.8	-0.3	15.5	11.3	6.6	18.4	25.7	
	II	4.32	1.13	89.3	88.6	89.0	-0.7	21.1	15.8	4.7	16.4	23.5	
	III	3.80	-0.15	80.2	82.1	81.2	1.9	19.5	16.7	5.5	15.2	22.5	
	IV	4.01	-0.55	81.5	82.2	81.8	0.7	22.3	17.8	5.1	17.8	27.2	
	V	4.33	-1.46	83.7	73.9	78.8	-9.8	20.6	17.2	8.0	15.3	22.3	

*Note. All manures are supplemented by fertilizers as shown in table on page 51/Ba/2.1