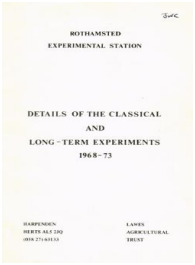
ROTHAMSTED RESEARCH

Details of the Classical and Long-term Experiments 1968-73



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R/AG/6 Agdell - Barley, Potatoes, Sugar Beet

Rothamsted Research

Rothamsted Research (1977) *R/AG/6 Agdell - Barley, Potatoes, Sugar Beet ;* Details Of The Classical And Long-Term Experiments 1968-73, pp 19 - 23 **- DOI: https://doi.org/10.23637/ERADOC-1-193**

AGDELL
RESIDUAL EFFECTS OF P AND K
(R/AG/6)

The cropping and management in 1968 and 1969 continued the pattern set in 1964 when large fresh dressings of P and K were applied to the sub-plots of both grass and fallow areas *(Details 1967,* pp 26-27. Note that the heading in Table 7 p. 27 should read 1920-51 and not 1920-53).

In 1970 a further scheme was introduced with annual applications of P (1970-72) and K (1973-75) to a three-course rotation of sugar beet, barley, potatoes (two crops present each year).

An outline of the layout of the plots from 1958 onwards is set out in the diagram on pages 22 and 23 to show the changes in plot boundaries and the relationship of the successive treatments. Details of treatments between 1958 and 1967 are given on pages 25-27 of *Details 1967.*

Detailed treatments 1968-73

(1) *P test half plots*

(a) 1968-69 – Half fallow, half Timothy (S 51 sown 1964) 3 dressings of 100 kg N applied each year to the grass. P and K applied each autumn or early winter to replace removals in grass the previous year, except that plots without fresh P in 1964 continued to receive none to measure the release of P residues accumulated during 1848-1951.

(b) 1970-72 – Effects of different amounts of soil P were tested in a three-course rotation – sugar beet, barley, potatoes, starting with sugar beet and barley. Fresh P was tested on the sub-plots cumulatively.

Barley	None v. 27 kg P
Sugar beet	None v. 55 kg P
Potatoes	None v. 82 kg P

Basal manuring. Sugar beet: 190 kg N; 260 kg K as muriate of potash; 60 kg Mg as kieserite.
Barley: 95 kg N, 50 kg K as (25-0-16).
Potatoes: 250 kg N, 210 kg K, 60 kg Mg – materials as for sugar beet.

(c) 1973 – Rotation ended, barley grown testing residues of P applied in 1964 and 1970-72 with a fresh N test applied in strips of sixty-fourth plots.

N1	63 kg N
N2	95 kg N

(2) *K test half plots*

(a) 1968-70 – Half-fallow, half Timothy (S 51 sown 1964).
100 kg N applied three times in 1968 and 1969, twice in 1970 to the grass.

Balancing P and K applied each autumn or winter to replace removals in grass, except that plots without fresh K in 1964 continued to receive none to measure the recovery of K residues accumulated during 1848-1951 and the release of soil K.

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(b) 1971-72 – The whole area was fallowed in 1971 and cropped with oats in 1972.

Standard applications: Oats – 75 kg N, 14 kg P as (30-13-0)

(c) 1973 – The three-course rotation commenced with sugar beet and barley.

K treatments applied in first year of rotation.

Barley	None v. 50 kg K
Sugar beet	None v. 257 kg K

Standard applications: Sugar beet: 190 kg N, 55 kg P as granular superphosphate, 60 kg Mg as kieserite.
Barley: 95 kg N, 18 kg P as (30-13-0).

(3) *Compensatory dressings of P and K*

Dressings of triple superphosphate and muriate of potash were applied to compensate for the removals in the grass during the years 1964-69 from the P plots and 1964-70 from the K plots. Dressings were normally applied annually to compensate for the removals during the previous season but in the period 1965-67 certain adjustments between years were made. (For details see *Results 1965 to 1970*).

No phosphate was applied to the PO plots and No K to the KO plots throughout the period.

The total removed and replaced (except on the PO and KO plots) were:

P (kg/ha)

	Sub-plots testing P				Sub-plots testing K			
	P0	P1	P2	P4	K0	K1	K2	K4
Plot 1	(102)	165	175	186	157	194	200	200
2	(68)	139	158	162	134	188	198	198
3	(67)	147	148	175	148	171	176	175
4	(48)	122	127	151	160	189	177	190
5	(38)	111	128	144	126	163	162	167
6	(22)	117	133	149	125	171	169	169

K (kg/ha)

	Sub-plots testing P				Sub-plots testing K			
	P0	P1	P2	P4	K0	K1	K2	K4
Plot 1	1398	1694	1664	1678	(689)	1453	1601	1787
2	1020	1481	1611	1532	(493)	1378	1631	1798
3	974	1525	1471	1576	(612)	1429	1441	1619
4	736	1387	1313	1451	(707)	1461	1509	1732
5	543	1303	1381	1449	(485)	1291	1423	1647
6	371	1311	1371	1379	(448)	1378	1363	1549

Liming

In the autumn of 1969 plots 1 and 2 and the south halves of plots 3 (P test) and 4 (K test) received ground chalk at 3 t

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Cropping and Weed Control

(1) *Varieties*

Sugar beet:	Klein E
Barley:	Julia (dressed with ethirimol 1973)
Potatoes:	King Edward, once grown Rothamsted paracrinkle-free seed, chitted.
Oats:	Manod

(2) *Weedkillers*

Potatoes:	1971 and 1972: Linuron with paraquat
Oats:	1972: Bromoxynil, ioxynil, dichloroprop and MCPA
Grass:	1968: Ioxynil with mecoprop.

Other Chemicals applied

Sugar Beet:	1970 and 1972:	Menazon, 1972: pyrethrum
Potatoes:	1971 and 1972:	Menazon and mancozeb, 1972: captafol

Areas harvested

Grass:	0.00081 – 0.00186
Barley:	0.00061 – 0.00087
Sugar beet:	0.00077
Potatoes:	0.00069

Soil series Winchester and shallow Batcombe series

References

1. Johnston, A.E., Warren, R.G., and Penny, A. (1970)
The value to arable crops of residues accumulated from superphosphate and from potassium fertiliser.
Rothamsted Experimental Station. Report for 1969, Part 2, 39-90.

2. Johnston, A.E., & Penny, A. (1972)
The Agdell Experiment 1848-1970.
Rothamsted Experimental Station. Report for 1971, Part 2, 38-68.

3. Johnston, A.E., & Mitchell, J.D.D. (1974)
Potassium in soils from the Agdell experiment.
Rothamsted Experimental Station. Report for 1973, Part 2, 74-97.

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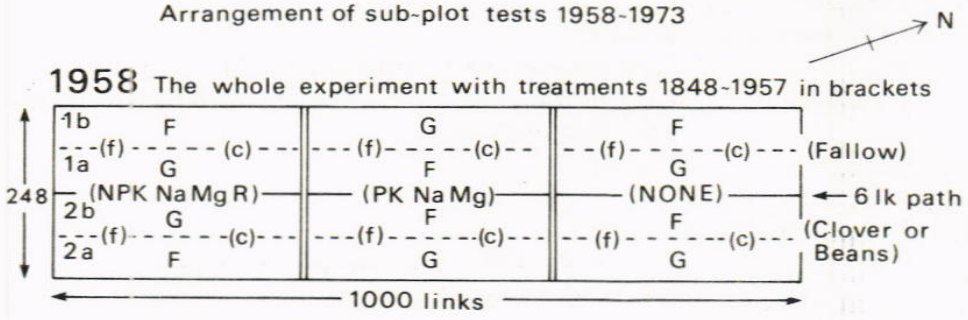
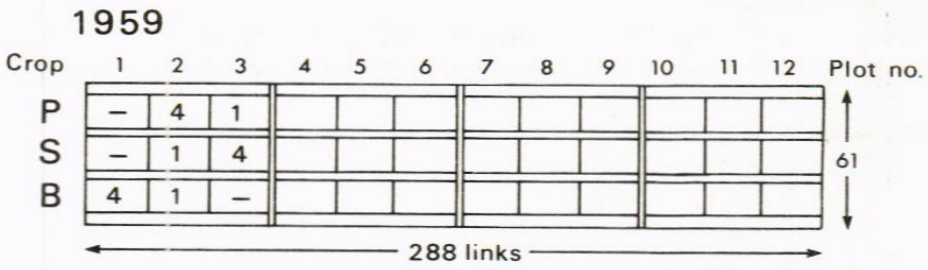
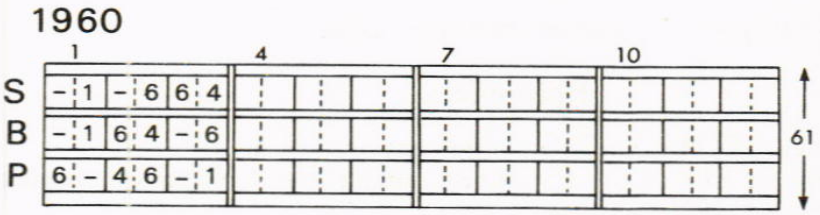
AGDELL

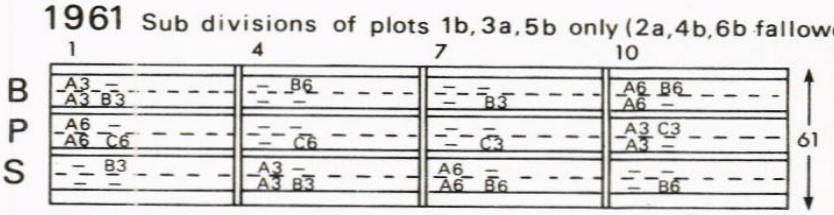
Arrangement of sub-plot tests 1958-1973



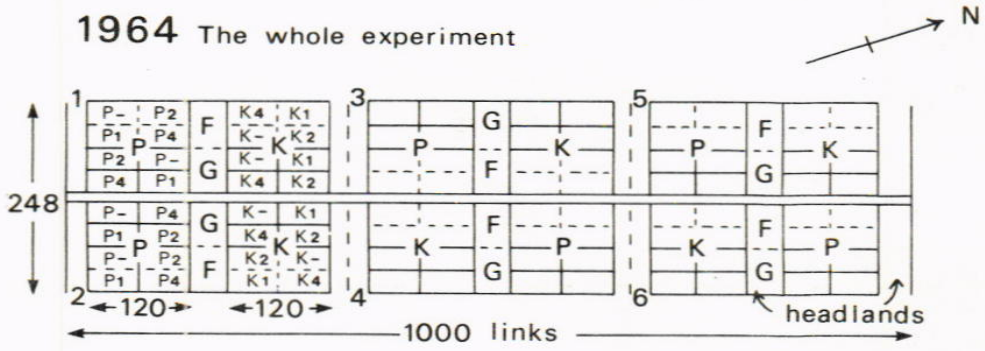
1959-63 Details of sub-plots on plot 1b (one replicate only shown)







1962 Plots 2a, 4b, 6b sub divided as above (1b, 3a, 5b fallowed)
1963 All plots fallowed
(1958-63 G plots remained in grass)



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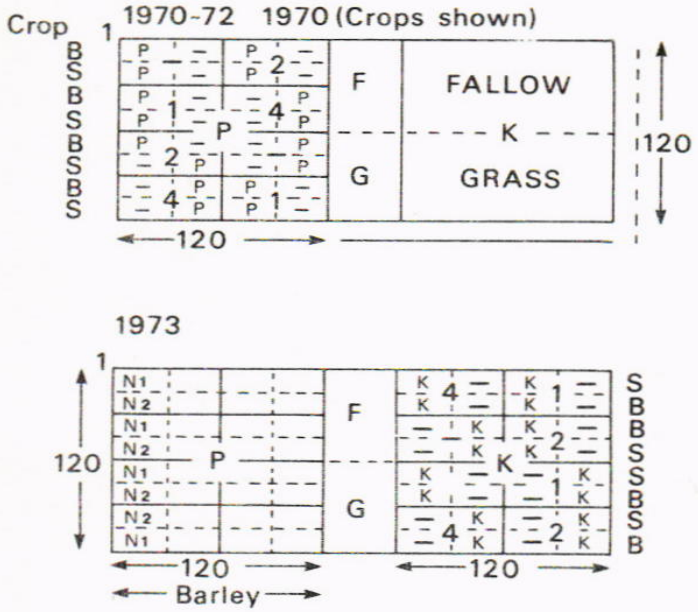
1970~73 Details of sub-plots on plot 1



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