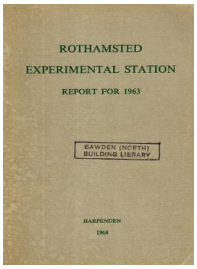
ROTHAMSTED RESEARCH

Rothamsted Report for 1963

Full Table of Content



Woburn Experimental Station

C. A. Thorogold

C. A. Thorogold (1964) *Woburn Experimental Station ;* Rothamsted Report For 1963, pp 199 - 203 **- DOI: https://doi.org/10.23637/ERADOC-1-56**

WOBURN EXPERIMENTAL STATION

C. A. THOROLD

Two gifts are gratefully acknowledged: Miss Hilda Voelcker presented a portrait of her grandfather, Dr. Augustus Voelcker, the first Director of the Woburn Experimental Station. Mr. P. A. Vasavada, of Jalahalli, Bangalore, presented books in appreciation of his associations with the late Dr. H. H. Mann.

Work was delayed by the severe winter. With ground under snow from 26 December 1962 to 3 March 1963 the thermometer at 1 ft depth, was at or below 1° C (about 33° F) from 12 January to 9 March. A minimum of 3° C (37·7° F) was recorded at 4 ft depth on 12 March, colder than in 1946–47 (39·4° F), when snow persisted longer.

Growing conditions in spring were mostly good, with rain well distributed and mean temperatures near average in March and April (Table 1). May was rather cool, with air frost on 4th, and ended with a dry spell that extended into June. The summer was cool and dull, with rain exceeding averages in August and September.

TABLE 1

Monthly mean temperatures (means of maximum and minimum), total rainfall and daily means of bright sunshine (departures from long-period means in brackets)

Month	Mean temperature (° C)	Rainfall (in.)	Bright sunshine (daily mean) (hours)
March	5·7 (+0·2)	2·89 (+1·31)	3·08 (−0·83)
April	8·4 (+0·2)	2·15 (+0·22)	3·90 (−1·01)
May	10·4 (−0·8)	1·31 (−0·89)	5·81 (−0·23)
June	14·5 (+0·1)	1·31 (−0·39)	6·56 (−0·05)
July	14·6 (−1·7)	1·53 (−0·91)	6·40 (+0·36)
August	14·1 (−1·9)	2·86 (+0·53)	3·83 (−2·03)
September	12·6 (−1·1)	2·31 (+0·28)	4·28 (−0·35)
October	10·8 (+1·1)	1·40 (−0·90)	2·73 (−0·66)

Barley was not drilled until 8 April in two long-term experiments, the Green Manuring and the Ley and Arable Rotations, later than in any previous year except 1947 (17 April) and 1951 (16 April). Winter wheat (Cappelle) developed satisfactorily in the spring, but was later damaged by mildew and cereal aphids. There was premature ripening, associated with "scorch", particularly where wheat followed spring beans (1962) and barley (1961), and the mean yield was only 26 cwt grain/acre. After carrots in 1962 and barley in 1961 winter wheat yielded 32 cwt grain/acre. Yields of potatoes and sugar beet were probably adversely affected because they could not be planted until late in April.

Many winged aphids were caught on sticky traps in August, but few

https://doi.org/10.23637/ERADOC-1-56

in September and none after. *Myzus persicae* were not caught until July; *Aphis fabae* were more abundant in June, July and August, than in 1962. Aphid viruses spread little. In an experiment on the control of carrot motley dwarf, the mean yield was about 20 tons roots/acre, and "Metasystox" did not increase yield.

Field Experiments

Market-garden experiment. In an attempt to improve the stand of globe-beet, the effect of treating seed with "Mergamma" (BHC and organomercurials) was tested. Treated (F) and untreated (O) seed was drilled in rows 14 in. apart on 9 May. Table 2 shows counts of seedlings per foot length of row made on 29 May, 5 and 12 June, before thinning on 14 June. It also shows plant numbers, weights and grade of roots at lifting on 22 July. Previously in this experiment, marketable beet were produced earlier by the organic manures than the fertilisers, and plots getting organic manure produced more plants (*Rothamsted Report* for 1962, pp. 186–193).

TABLE 2

Effects of manures and of "Mergamma" treatment of globe-beet seed on numbers of seedlings, numbers of plants, yields and grades

Dung, tons/acre	0		10		20	
"Mergamma" treated (F) Not treated (O)	O	F	O	F	O	F
No. seedlings (thousands/acre)	255·1	354·7	311·2	460·5	311·2	466·7
No. plants (thousands/acre)	109·3	127·1	118·1	140·7	112·4	137·9
Total produce (tons/acre)	9·3	10·2	12·8	13·5	14·4	16·6
Grade I (% of total produce)	2·0	0·4	2·8	1·8	7·6	4·8
Grade II (% of total produce)	73·7	72·0	85·3	82·0	85·2	86·5
Grade III (% of total produce)	24·3	27·6	11·9	16·2	7·2	8·7
Mean weight (oz/plant)	3·1	2·9	3·8	3·4	4·6	4·3

Grading on root diameters: Grade I, over 2½ in., Grade II, 1½–2½ in., Grade III, less than 1½ in.

"Mergamma" improved germination, and this benefit was reflected in larger numbers at harvest. Even without "Mergamma", the mean number of plants (113,000/acre) exceeded previous means (fewer than 100,000/acre). The better stand in 1963 partly reflects the smaller distance between the rows, 14 in. instead of 18 in. As before, marketable beet were produced earlier with organic manure, shown by larger proportions of Grade I roots with dung at 20 tons/acre than with dung at 10 tons/acre, or with fertilisers only. Whereas "Mergamma" increased final plant numbers, dung increased the mean weight of roots. Consequently, the largest yield (16·6 tons) came from the combination of "Mergamma" dressing with dung at 20 tons/acre.

Long-term green-manuring experiment. Because of root-eelworm infestation, potatoes were replaced by sugar beet for testing the effects of green manures undersown in barley in 1962. Trefoil increased yield by more than 2 tons roots/acre, and ryegrass by 1½ tons. The corresponding increases as sugar were 7 cwt and 5 cwt/acre. Trefoil and ryegrass sown after early potatoes in 1962 increased the yield of barley by 11 cwt grain/acre.

https://doi.org/10.23637/ERADOC-1-56

Irrigation Experiment

Ley crops. In a mixed sward containing White Clover and Canadian Alsike watering in 1951, 1952 and 1953 increased the proportion of clover. After the first two cuts in 1953 the percentage of clover declined, especially on plots given most water (*Rothamsted Report* for 1953, p. 159). Pure stands of clover in 1962 and 1963 also failed to maintain growth after an initial flush.

Crimson Clover (*Trifolium incarnatum*) seed was broadcast on 18 April, and grew well before cutting, but yields depended greatly on amount of water applied. Plots given 2¾ in. in May and June (A and C) produced about 50% more dry matter than unirrigated plots (O and B) when cut on 10 July (Table 3). Plants on the drier plots were then in full flower, whereas on the wetter ones they were coming into flower. Rain later was almost adequate for estimated needs, and only one further irrigation of 0·5 in. was applied to B and C plots. Because of great differences in growth after the first cut, another normal cutting of all plots was impracticable. Amounts of material were estimated by samples taken at the second cut on 10 August, when the initially unirrigated plots (O) gave the greatest mean weight (23·5 cwt dry matter/acre), and the ½ in. application the next largest (21·9 cwt dry matter/acre). The irrigated plots (A and C), which at first cut were most luxurious, never recovered after the first cutting.

TABLE 3

Effects of irrigation on mean weights of crimson clover (cwt dry matter/acre) at two cutting dates

Irrigation	O	A	B	C
First cut (10 July)	16·0	26·5	17·9	25·0
Second cut (19 August)	23·5	15·6	21·9	11·4
Total, two cuts	39·5	42·1	39·8	36·4

O, no watering: C, 2¾ in. May–June, ½ in. July: A, 2¾ in. May–June: B, ½ in. July.

Crimson Clover is an annual, so only one cut was expected, and the main object of the experiment was achieved at time of first cutting (10 July), but the considerable effect of irrigation on aftermath is of interest.

Lucerne (*Medicago sativa*) was drilled in April 1962, and the crop was cut three times in 1962 and three times in 1963. At the first cut on 17 July 1962 (Table 4), the yield was almost doubled by 3½ in. of irrigation in the

TABLE 4

Response of lucerne to irrigation (cwt dry matter/acre)

	1962		1963			
	O	C	O	A	B	C
First cut	14·4	26·0	26·0	28·6	27·7	27·6
Second cut	19·0	17·3	18·2	16·6	19·1	13·8
Third cut	13·6	10·7	19·9	19·8	20·2	17·4
Total, 3 cuts	47·0	54·0	64·1	65·0	67·0	58·8

O, no irrigation: C, "full" irrigation; A, "early" irrigation: B, "late" irrigation.
Cutting dates: 1962, First 17 July; Second, 20 August; Third, 3 October
1963, First 19 June; Second 29 July; Third, 27 September

https://doi.org/10.23637/ERADOC-1-56

period 8 June to 10 July, irrigated plots produced 26 cwt dry matter/acre and unirrigated 14 cwt. There was no further irrigation, and at later cuts the previously unirrigated plots gave the bigger yields.

In 1963 "early" and "fully" irrigated plots (A and C) had 2 in. of water before the first cut, but this apparently gave little benefit, because whereas these plots yielded 28 cwt dry matter/acre, unirrigated ones (O) yielded 26 cwt. The "late" and "fully" irrigated plots had $1\frac{1}{4}$ in. between first and second cuts, when irrigation stopped. At the third cutting the mean yields of the unirrigated (O), "early" (A) and "late" (B) irrigated plots were similar (20 cwt dry matter/acre), but the yields of "fully" irrigated plots (C) had declined after the first cut.

Sugar beet. As expected from previous experience (1951–59), the summer was such that there was no important response to irrigation. The only effect of probable significance was an increase in roots, tops and sugar by the "late" application of 2 in. of water in the second half of July (B), which is in accord with experience. Earlier irrigation had little or no effect (Table 5).

TABLE 5

Effects of irrigation on sugar-beet yields (roots, tops, total sugar)

Irrigation	O	A	B	C
Roots (tons/acre)	16·9	17·1	18·9	17·7
Tops (tons/acre)	11·5	11·3	12·0	10·5
Sugar (cwt/acre)	63·0	64·0	70·5	66·6

O, no watering: C, $2\frac{3}{4}$ in. May–June, $\frac{1}{2}$ in. July; A, $2\frac{3}{4}$ in. May–June; B, 2 in. July.

Dairy Farm. Of 44 acres of land obtained in 1962 by renting the Dairy Farm (see map of Woburn Farm at the end of the Report), half is suitable for field experiments.

Green-manuring with Trefoil in Irrigation Experiment

By H. L. PENMAN and C. A. THOROLD

After a rotation without potatoes, the eelworm population had decreased enough to justify growing potatoes again, in 1960–62, as part of a rotation: early potatoes, trefoil or fallow, barley. In addition to the main experiment (irrigation *v.* no irrigation), half of the potato plots received ordinary cultivations (M), whereas the others were given minimum cultivation with superimposed treatment (S) with herbicides. After the potatoes, half of the block was left fallow and the other half drilled with trefoil (*Medicago lupulina*), which was ploughed in, in February (1961, 1962) or March (1963), and barley was drilled in March (1961, 1962) or April (1963).

The possible interactions were too many, and the number of plots too few to permit any detailed analysis. The important outcome at present is that the previous treatments on the potatoes had no obvious effect on the barley yields, the differences M–S being: −2·3, −0·6, +1·2 cwt grain/acre with irrigation of the barley, and +0·4, 3·2, −2·6 cwt grain/acre without irrigation, in 1961, 1962 and 1963. Assuming the residual effects

https://doi.org/10.23637/ERADOC-1-56

of potato management to be negligible, they are ignored in Table 6. Obviously the trefoil had no effect in 1961, an expected result, because the

TABLE 6

Barley yields (cwt grain/acre) after fallow and after trefoil

		1961	1962	1963	
Fallow	O N_1	23·5	18·1	17·4	
	C N_1	28·3	27·4	20·1	
	O N_2	31·8	22·5	26·3	
	C N_2	34·2	36·2	32·6	
	Mean	29·5	26·1	24·1	
Trefoil	O N_1	23·2	27·7	21·5	
	C N_1	29·4	40·7	24·9	
	O N_2	31·2	22·3	29·4	
	C N_2	36·0	42·9	32·1	
	Mean	29·9	33·4	27·0	
O	No irrigation				
C	Irrigated	3·2	3·5	2·8	in.
N_1	Nitrogen	0·2	0·2	0·3	cwt/acre
N_2	Nitrogen	0·4	0·4	0·6	cwt/acre

trefoil crop was very poor and very irregular, perhaps from a lack of nodule bacteria. For 1962 and 1963 the trefoil seed was inoculated and growth was much more satisfactory.

The outstanding treatment effect in 1962 was the response to irrigation (C–O), and this was better after trefoil than after fallow, with differences large enough to suggest that a more detailed experiment, with adequate replication, will be worthwhile in the future. The 1963 results are less clear, but are almost certainly confused by the presence of clover (undersown as part of the new rotation) in the barley crops, and by an increase in the nitrogen dressings applied.

https://doi.org/10.23637/ERADOC-1-56