ROTHAMSTED RESEARCH

Report for 1930

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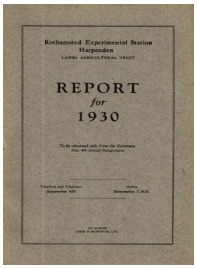

The Use of the Summary Tables

Rothamsted Research

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THE USE OF THE SUMMARY TABLES

The summaries of the significant results from the replicated experiments, whether these are stated as produce per acre or as a percentage of the average yield, are accompanied by estimates of the standard errors to which these results are liable. The agricultural precautions which have to be taken in order that these shall be certainly valid were explained in the Report for 1925-26. An explanation of their purpose is desirable here in order that a full use of the summaries may be made by those who do not wish to make for themselves a detailed examination of the yields recorded for individual plots.

An experimental yield will differ from its true value either in excess or deficit by an amount exceeding its standard error almost as frequently as once in 3 trials; it will, however, be wrong by more than twice its standard error only about once in 22 trials, and by more than three or four times its standard error once in 370 or 15,780 trials respectively. The odds against an error of any size having occurred thus increase very rapidly in a small range of multiplies of the standard error. Whereas experimental differences of less than twice their standard error might always be ascribed to chance, and are, therefore, for safety, ignored as "insignificant," differences only slightly greater than these cannot reasonably be disregarded, but must be ascribed to genuine manurial or cultural effects, such as the experiment was designed to examine.

The rejection of the insignificant differences is thus a necessary preliminary, but only a preliminary, to the interpretation of the experimental results. So far as has been practicable all significant results are noted, and exhibited in the summaries of significant results. In the more successful and extensive experiments the standard error has been reduced to so low a figure, sometimes considerably less than 2 per cent, that quite small differences in yields can be detected, whereas with a standard error of 5 per cent, all but big and obvious differences in yield must be ignored. The change in precision from standard errors of 5 per cent, to standard errors of 2 per cent, or less, thus represents a very large extension in the range of agricultural effects which can be examined experimentally.

Once an effect is shown to be definitely significant it makes little difference whether the odds against its being due to chance are 100 to 1 or 1,000,000 to 1. Chance is effectively excluded in both cases, and the interest in the result is now concentrated on the actual gain in crop, either in yield per acre, or in yield per cent, which the experiment has demonstrated. The relation of

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this gain to any additional item of expense incurred, such as the cost of a manurial application, then determines the balance of advantage in practical procedure. Read in this way the summary tables give the direct results of critical experimentation.

THE NUMBERING OF THE FIELD PLOTS IN THE ROTATION AND REPLICATED EXPERIMENTS

Each plot designation consists of two letters and a number, with the addition that these may, for laboratory purposes, be prefixed by 31, 32, etc., to denote year.

The first letter signifies the place, and, in the case of the Rotation experiments, the nature of the experiment. Thus :

Rothamsted Four Course Rotation	=	A
Rothamsted Six Course Rotation	=	B
Woburn Six Course Rotation	=	C
Otherwise Rothamsted Experiments	=	R
And Woburn Experiments ..	=	W
Outside Centre Experiments	=	D, E, F, etc.
(Leaving out I)		

The second letter designates the crop, and is usually the first letter of the word for the crop. Thus :

Wheat ..	=	W	Turnips ..	=	T
Barley ..	=	B	Mangolds ..	=	M
Oats	=	O	Hay	=	H
Potatoes ..	=	P	Clover ..	=	C
Sugar Beet ..	=	S	Forage.. ..	=	F
Swedes ..	=	G	Rye	=	R
Lucerne ..	=	L, etc.			

The plots of each experiment are serially numbered from 1 to n. If more than one experiment is laid down on the same crop at the same centre, apart from the Rotation experiments, the plots are numbered 1 to p, p + 1 to q, q + 1 to r, etc.

The letters denoting outside centres remain the same for the same centre in different years, provided that if a centre drops out of the experimental programme, and is not likely to re-enter, its letter may be in time allotted to another centre. Both letters will be required to identify centre and crop, *i.e.*, the same letter may be used for two centres where the crops are very different and likely to remain different. It is recommended that the code letters for place and crop be used in all correspondence concerning these experiments.

Samples stored by the Chemistry Department bear a label giving the full plot symbol, as herein defined, together with the year, and such other notes, *e.g.*, grain, straw, etc., as may assist in identifying the sample where more than one has been taken from the same plot.

Illustrations :

AW 49	Rothamsted Four Course Rotation	wheat–plot 49
CS 36	Woburn Six Course Rotation	sugar beet–plot 36
RW 1–96	Rothamsted Wheat Experiment	variety trial
RW 97–144	Rothamsted Wheat Experiment	Great Knott
KP 7	(*e.g.*) Welshpool	potatoes–plot 7

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