

MANURING OF WHEAT WITH PHOSPHATES

Trials with Super & Serpentine Super

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THE drilling of phosphatic fertilisers with wheat has become almost universal in wheat-growing areas of New Zealand. The quantity normally applied is 1cwt. of superphosphate an acre in Canterbury and 2cwt. in Otago and Southland and in the North Island. However, experimental evidence suggests that this higher rate is unnecessary in the majority of cases.

WITH the introduction of serpentine superphosphate information was required as to the merits of this material in comparison with superphosphate as a wheat fertiliser, and a large number of experiments have been laid down since 1941. Before proceeding with a critical examination of 20 of these trials it is desirable to describe the manner in which these wheat experiments are conducted and the variations in responses to superphosphate which have been measured since the trials were commenced.

Co-operative Wheat Experiments

These trials are laid down on various farmers' properties throughout wheat-growing areas. In the majority of cases they are on a "randomised block" layout, each treatment being replicated or repeated in a number of plots throughout the trial. The layout is designed in such a manner that statistical analysis of yields enables one to give the probabilities that the differences between treatments as measured are really due to the different treatments and not to other sources of variation such as soil and various errors associated with the experiment. When the probability that the treatment effect is a "real" one is at least 19 to 1, the effect of or response to that treatment is said to be "significant." Similarly differences between treatments are "significant" or "not significant."

Each plot is usually 2 chains long and 7 coulters wide and is drilled with special experimental drills sowing 7 coulters. The total area of the experiment is about half an acre. At all times the trials are under exactly the same influences that are affecting the



main crop in the farmers' paddock in which the experiment is located, and the results are what the farmer would obtain if he used the treatments used in the trial.

Before dealing with the superphosphate-serpentine superphosphate comparison it is of interest to examine the responses to 1cwt. of superphosphate an acre that have been secured on wheat manuring trials since they were first conducted in 1928-29:—

The table below shows that there is a definite trend for responses to superphosphate to decrease over the last 15 to 20 years. This trend is probably due to a gradual build-up in fertility of the wheat-growing soils during this period. There is strong practical evidence for believing that such an increase in fertility has been brought about during the period the land is in grass. The productivity and stock-carrying capacity of such pasture

Seasons in which trials were conducted.	Number of trials harvested.	Yields in bushels an acre. Difference 1cwt. superphosphate from "No Manure."	
		Range of differences.	Average response.
1928-29	15	1.2 to 13.8	6.6
1929-30	32	0.4 to 7.0	3.8
1930-31	27	0.3 to 7.6	3.1
1931-32	21	2.1 to 12.7	5.1
1932-33	3	2.0 to 7.6	4.5
1933-34	8	0.3 to 6.8	2.4
1934-40	10	-1.7 to 7.2	1.8
1940-41	7	0.0 to 5.8	2.3
1941-42	6	-0.1 to 2.9	1.0
1942-43	11	-2.6 to 6.1	1.4
1943-45	5	-2.2 to 3.1	1.0
1945-46	5	0.3 to 2.3	1.4
Totals and averages	150	-2.6 to 13.8	3.4