

Trials with Nauru Rock Phosphate as Pasture Topdressing



TRIALS conducted by the Department to investigate the value of raw ground Nauru rock phosphate as a topdressing fertiliser for pastures are described in this article by K. Cottier, Instructor in Agriculture, Department of Agriculture, Wellington. The conclusions reached are summarised below.

THE first accurate trials, begun in 1921, were haying trials in which the growth on plots which had been topdressed was weighed at the hay stage to compare responses in pasture growth from various fertilisers. Plots were closed for hay production after they had been topdressed and the hay yields measured by weighing the material green immediately after it had been cut. This technique has since been superseded by other methods, but the results of a series of trials extending from 1921 to 1930 are of value, especially as many of the trials lasted for several years and were accompanied by observations on the appearance and composition of the pasture at all seasons.

Haying Trials at Te Kumi

One of the earliest haying trials was at Te Kumi, about 2 miles from Te Kuiti. This was begun in 1921 to compare the effect of ground Nauru rock phosphate with those of superphosphate and basic slag. The area selected had not been topdressed for 5 years. The land was a light loam with good drainage and carried a reasonably good sward of cocksfoot, perennial ryegrass, and dogstail, with some white clover.

The phosphates were applied annually at the rate of 3cwt. per acre from 1921 to 1924 inclusive. Half of the superphosphate and Nauru rock phosphate plots also received an initial topdressing in 1921 of 1 ton of carbonate of lime per acre. Thus a comparison was obtained between these two forms of phosphate both with and without lime.

Green hay yields were obtained in each summer after topdressing except in the 1923-24 season, when the area was grazed with dairy cows and no hay crop was taken. In addition the trial was continued for a season without topdressing and hay yields were also secured for that year. Results were:—

GREEN WEIGHTS OF HAY MATERIAL (tons per acre)

Treatment	January 1922	January 1923	1924	January 1925	January 1926	Totals
Control ..	1.2	1.1	No hay —area grazed with dairy cows	1.3	0.7	4.3
Basic slag ..	1.5	1.6		2.2	1.0	6.3
Superphosphate	2.1	2.1		2.6	1.2	8.0
Nauru phosphate	1.5	1.5		2.4	1.0	6.4
Superphosphate and lime ..	2.1	2.0		2.4	1.1	7.6
Nauru phosphate and lime ..	1.4	1.3		1.9	0.9	5.5

Conclusions Drawn

EXPERIMENTS summarised in this article lead to the following conclusions:—

In most parts of New Zealand superphosphate gives better results than Nauru rock phosphate as a pasture topdressing. However, in some haying and mowing trials Nauru rock phosphate gave appreciable responses over unfertilised plots, and in most of the observational trials it gave some responses.

Two early haying trials gave no evidence that fine grinding of Nauru rock phosphate would improve its effectiveness as a pasture topdressing, but this requires further testing.

In most trials Nauru rock phosphate was considerably slower than superphosphate in causing pasture responses.

In only a few trials did Nauru rock phosphate show greater residual effect than did superphosphate, but observations for this purpose were not continued on a large number of trials when topdressing had ceased.

Trials with superphosphate-Nauru phosphate mixtures have not, on the whole, given encouraging results so far.

The figures show that phosphate responses were considerable, with superphosphate giving the best yields. Ground Nauru rock phosphate, though giving definite responses in hay yields, produced lower yields than did superphosphate, though with the progress of the trial it improved its position somewhat.

Though there was no lime response in the trial, it appeared that Nauru phosphate was rather less effective on the limed plots than on the unlimed. This effect was consistent in all the hay crops.

Just before the hay crop of 1926 the superphosphate plots were the best in appearance, with a good dense sward and bottom growth. Nauru plots were comparatively poor, with many weeds.

Haying Trials at Marton

At Marton Experimental Area several long-term haying trials were conducted at this period to compare hay-growth responses to Nauru rock phosphate and other phosphates. The soil is Wanganui silt loam and is representative of large areas of farmland in the lower parts of the North Island.

Moss's Area

In this trial ground Nauru rock phosphate was compared with superphosphate, superphosphate and lime, lime, and basic slag. Each phosphate was applied at 3cwt. per acre yearly from 1925 to 1930 inclusive, except in 1927, when there was no topdressing. Results were:—