

DESCRIPTION AND PROGRESS OF EXPERIMENTS.

(1) GRASSLAND.

(a) *Yield Trials under Mowing and Grazing Technique.*

At Marton Experimental Area seven trials are being conducted, and these investigate the following:—

(1) *Different Methods of applying Carbonate of Lime.*—The first four-year period of this experiment has just been completed, during which an initial dressing of 2 tons carbonate of lime gave 11 per cent. increase over no-lime, as against 7 per cent. increase from a 1 ton application. Smaller dressings of 10 cwt. every two years and 5 cwt. every year gave responses rather less than that obtained from the same quantity of lime applied as a single initial dressing.

(2) *Trial of Limestones from different Sources and different Degrees of Fineness.*—Two distinct types of limestone, one a fairly hard stone and the other a soft stone, are on trial and these are applied in the form of commercially ground, coarsely ground, and finely ground material respectively. The results after two years do not show any marked differences although the commercial and fine samples are both slightly better than the coarse samples.

(3) *Trial of Super, Basic Slag, and Gafsa (North African) Phosphate on Limed and Unlimed Ground.*—After four and a half years' work on this experiment the yields from unit quantities of phosphate in super and slag show similarity, while equivalent amounts of phosphate applied in the form of Gafsa have given about 5 per cent. lower production. It is indicated that the performance of both slag and Gafsa has been improved during the past two wet seasons, since in the first two years super was distinctly superior to both slag and Gafsa. Liming (carbonate 1 ton initial and 3 cwt. per acre annually) has improved the performance of super by about 7 per cent., but has only made slag and Gafsa more effective by about 3 per cent. and 4 per cent. respectively.

(4) *Trial of different Forms of Nitrogen.*—This experiment has been discontinued recently. The nitrogenous fertilizers under trial—viz., sulphate of ammonia, ammoniated super, Nitrochalk, and nitrate of soda—all gave responses soon after application varying from 10 per cent. to 20 per cent., according to season, but such increases usually disappeared several weeks after application and were followed by periods of production lower than that of the no-nitrogen plots. This "slumping," which brought down the increases from nitrogen over any particular season to the vicinity of 3 per cent., occurred in spite of adequate supplies of phosphate, potash, and lime being maintained. The application of the phosphate and nitrogen at the same time as in ammoniated super did not mitigate against these undesirable after-effects as compared with sulphate of ammonia and superphosphate applied separately.

(5) *Trial with different Cocksfoot Strains.*—In this trial Akaroa cocksfoot is compared with the Aberystwyth, Danish, and C. 23 strains. Over a four-year period Akaroa, Aberystwyth, and C. 23 have been about equal in yield of dry matter, whereas Danish cocksfoot is much lower in production. The plots of the latter are now virtually white-clover plots as the cocksfoot has disappeared.

(6) *Trials with Pedigree Lines of Rye-grass and Clovers as compared with Certified Lines.*—Two methods are employed in carrying out this investigation but only a few months' data is available.

(7) *Pasture Cultivation Trial.*—This aims to investigate the effect of drastic harrowing a good rye-white pasture. Much has been said regarding the benefits to be derived from pasture cultivation apart from the mere spreading of cattle-droppings. As the experiment is on sheep pasture, the effects from spreading animal-manure are of minor detail. After two years the results indicate that no increase in production has been obtained from pasture cultivation either in autumn, winter, or both autumn and winter.

At Ruakura Farm of Instruction four mowing and grazing trials are being carried out to investigate the use of lime, phosphate, and potash on the major soil types of the Waikato. As the response to lime has been general in these experiments, which are on newly-sown pasture, and this does not bear out observations from trials previously conducted on old pasture, it is necessary to find out whether there is a difference of lime reaction on old and new pastures respectively. To this end a further mowing trial is to be laid down in the near future.

(b) *Observational Top-dressing Experiments.*

About four hundred observational trials are being carried out on pasture to investigate the effects of phosphate, lime, and potash on various soil types. Most of these now also include a comparison of different forms of phosphate. Results of these trials are published from time to time in the *New Zealand Journal of Agriculture*.

(c) *Demonstrations and Trials of Grass and Clover Strains.*

Areas which serve both for experimental and demonstrational purposes are established in nearly all districts. They include the desirable and undesirable strains of the main herbage species and also introduce to farmers the new pedigree lines which are brought out periodically by the Grasslands Division of the Plant Research Bureau.

(d) *Grazing Trials.*

Of the six experiments carried out in which production of one treatment is compared with that of another by means of grazing units, two compare potash dressings with no potash in Taranaki, while the remainder are designed to measure the production of different rye-grass strains. One of the latter has recently been laid down at Winton Experimental Area to compare the better-type Southland seed with certified rye-grass under sheep grazing, and records are to include weights of lambs reared on the respective areas.

(e) *Clover-inoculation Trials.*

These trials, which investigate the effect of inoculating red and white clover seed, are being continued, although in some experiments recently laid down the value of different strains of culture produced at the mycological laboratory is being investigated. Although some good results have occasionally been obtained from inoculating clover-seed, the position is yet too obscure to make definite recommendations.

(f) *Subterranean Clover Experiments.*

Thirty-two experiments are being conducted with subterranean clover. These include strain trials in districts where the species is already being extensively grown, ecological trials in other districts, and a number of exploratory trials on hill country to determine whether by means of subterranean clover top-dressing can be profitably exploited. Further experiments are to be sown this autumn.