GRASSLAND INVESTIGATIONS AND DEMONSTRATIONS CARRIED OUT BY FIELD OFFICERS OF THE FIELDS DIVISION.

Grazing Trials to determine the Relative Merits of Hawke's Bay Certified Perennial Rye-grass and Typical Canterbury "Perennial" Rye-grass.—The six trials which have been conducted in Canterbury over a period of four years are being continued. The fields sown with the certified perennial rye-grass have given up to date an average increase of about 30 per cent. more grazing than the fields sown with Canterbury rye-grass. This margin of superiority has been almost constant during the past three seasons, and it would appear as if a state of equilibrium has been reached. The individual increases in favour of the certified rye-grass range from 11 per cent. to 67 per cent.

A trial similar to the above has been laid down at the Winton Experimental Area to compare certified perennial rye-grass with a mixture of local lines of uncertified seed.

Observational Top-dressing Experiments.—There are about 250 observation top-dressing experiments now in existence throughout New Zealand in pursuance of surveying grasslands as to their response to lime, phosphate, and potash. Preparations are being made for this number to be increased during the coming autumn. An extension of the work has already been possible in North Taranaki, in which district only a limited number of trials had hitherto been established. A striking feature in most of the North Taranaki experiments was the marked response to potash within two months of application, and the results have been so consistent as to warrant a general statement being made by the Fields Superintendent regarding the advisability of farmers at least trying potash in a defined area in Taranaki. Results such as these justify the policy of establishing a large number of small, simple experimental plots throughout the country, and indicate that major soil deficiencies can be determined rapidly and cheaply. It seems obvious that potash must figure prominently in the future fertilizer programme on the more intensively farmed land in North Taranaki and also possibly to some extent in South Taranaki, and the acquiring of more exact information regarding the effects associated with different methods and frequencies of its application is highly desirable in order that farmers may be better guided into using it to the best advantage.

In addition to the common effect of phosphate, interesting results from lime, and in some cases potash, are being obtained from experiments in other districts; but the concentration of experiments in these areas has not as yet been sufficient to warrant any such definite recommendations as have been made for North Taranaki. In some districts superphosphate has given little or no result, and while this can in some instances be ascribed to deficiency of lime as evidenced by the effect of lime in the trials, in others neither super nor super plus lime has been effective. The use of basic slag as well as that of super is being investigated in experiments in these districts.

Demonstrations and Trials of Rye-grass and Clover Strains (in Collaboration with the Agrostologist).—These trials have proved of great value not only for purposes of testing strains of rye-grass and clovers under varying soil conditions, but also for demonstrating to farmers the importance of sowing approved strains. Their value for field demonstrations has been such as to create a demand for further areas being laid down in other districts. Altogether thirty-seven of these trials are now in existence and others are to be laid down during the present autumn or next spring. In addition to rye-grass and clover strains, different strains of other herbage plants and varying seeds mixtures are included in the new trials. Alongside these demonstrational areas top-dressing experiments are laid down.

Legume Inoculation Trials (in Collaboration with the Mycologist).—A large number of simple experiments to determine the effect of inoculating red clover, white clover, lupins, and field peas were sown in the autumn of 1933 and in the following spring. While results have not so far been sufficiently good to warrant any recommendation, in isolated cases there have been definite differences in favour of the inoculated seed. In nearly all the autumn-sown experiments clover establishment was a failure irrespective of treatment.

Seed Production (in Collaboration with Seed Analyst).—The experiments on manuring and different stages of cutting of Chewings fescue and perennial rye-grass respectively have been continued at the Gore Experimental Area. Seed has been harvested from these and is being examined by the Seed Analyst. Similar trials in the 1932–33 season gave no indications that manuring had any appreciable effect on germination. A trial on the effect of fertilizers on rye-grass-seed production in Central Otago could not be harvested on account of adverse weather conditions and lodging of the crop.

EXPERIMENTS ON ANNUAL CROPS CARRIED OUT BY FIELD OFFICERS OF THE FIELDS DIVISION.

Wheat.

Manuring.—Eleven experiments on the manuring of wheat were carried out in the Canterbury and North Otago Districts. Ten of these compared superphosphate with no manure, but only eight were harvested. The average increase in favour of super at 1 cwt. per acre was 2·4 bushels per acre. Since the average increase due to super 1 cwt. in 124 experiments conducted to date has been 4·1 bushels, the effect in the past season is well below the average, and due in part to the selection of one or two districts in which phosphate effect is known to be small.

One trial investigated the use of nitrogen top-dressing on a crop showing signs of nitrogen starvation. A series of such trials had been contemplated, but on account of the mild winter experienced in 1933, crops showing signs of obvious nitrogen deficiency and suitable for purposes of experiment were difficult to locate.

Variety.—Twenty-nine variety trials were carried out in collaboration with and on behalf of the Wheat Research Institute. In all but three of these Solid Straw Tuscan was compared with Cross 7, the latter being a cross of White Fife with Solid Straw Tuscan supplied by the Wheat Research Institute. In sixteen experiments Solid Straw Tuscan was superior to Cross 7, in eight trials Cross 7 was the heavier in yield, in one trial the yields of both varieties were identical, while one trial was not harvested owing to severe injury by a late spring frost. The average difference in favour of Solid Straw Tuscan was 0·7 bushels per acre. Jumbuck was compared with Solid Straw Tuscan in three spring-sown experiments, one of which could not be harvested owing to severe lodging of the crop. In another trial at Fernside there was no significant difference between the two, while in a trial in South Otago in which Marquis and Solid Straw Velvet were also included Jumbuck was 9 bushels per acre lower in yield than Solid Straw Tuscan. Severe bird damage on the earlier ripening Jumbuck may have contributed largely to the difference in yield. Solid Straw Tuscan was better than Marquis by 3 bushels, and about equal to Solid Straw Velvet in this trial.