

CROP EXPERIMENTS SECTION.

FIELD EXPERIMENTS.

The programme of field experimental work is now very comprehensive, and about 750 experiments of various kinds are under way in New Zealand.

Records of Experiments.—A system of reporting and recording has been introduced and is working satisfactorily. The system enables each fields officer to keep a complete record of all work in his district, and provides for equally complete records being kept by the Crop Experimentalist at Palmerston North. The records of every experiment are reviewed from time to time and kept up to date, so that no experiment can be allowed to lapse for want of attention or interest. Transfers or resignations of officers will not interfere with the continuity of investigations, as the records will enable new officers to get full details of the previous history of each trial.

Classification of Experiments—

- A. Research into fundamental grassland problems being carried out at (1) Experimental Farm, Marton; (2) Farm of Instruction, Ruakura; (3) Experimental Farm, Winton; (4) Technical College, Christchurch (co-operation with).
- B. Grassland investigations and demonstrations being carried out by fields officers of the Fields Division.
- C. Annual crop experiments being carried out by fields officers.

A. Research into Fundamental Grassland Problems.

The following work is being carried out at Marton Experimental Farm:—

(i) Trial of effect of applying super and slag as winter, spring, summer, and autumn applications, respectively: This trial has been under way since August, 1928 (twenty months). The main features are (1) that super shows a consistent superiority over slag, especially during low-production periods; (2) that summer application of superphosphate has the greatest effect in increasing growth during low-production periods from February to August; (3) that fluctuation in production is enormous, ranging from about 10 lb. per acre per day to 300 lb. per acre per day of green material.

(ii) Trial to determine effect of three distributed applications per annum of super, super + sulphate of ammonia, and super + sulphate of ammonia + potash, and to compare ammonium phosphate and nitrophoska with the appropriate mixtures above.

(iii) Trial to determine whether a heavy application of super at infrequent intervals is as effective as smaller applications at more frequent intervals.

(iv) Study of effect of applying sulphate of ammonia at intervals of two months on different plots.

(v) Trial to determine the effect on production of utilizing herbage at 2 in.–3 in. stage and 4 in.–5 in. stage.

(vi) Trial to determine whether any loss of nitrogen occurs when sulphate of ammonia is mixed with carbonate of lime.

(vii) Sheep-grazing trials to determine the economic returns from top-dressing with nitrogen.

B. Grassland Investigation and Demonstration carried out by Officers of the Fields Division.

(1) Grazing trials on dairy-farms: Most of the eighty trials being conducted in the North Island were continued, and about fifteen were inaugurated in the South Island, principally in Southland. Each of these trials consists of the trial of one paddock receiving phosphate against another paddock receiving phosphate plus nitrogen. This series of trials is providing much valuable information on rotational grazing.

(2) Grazing trials to determine the relative merits of Hawke's Bay perennial rye-grass and so-called Canterbury perennial rye-grass in Canterbury: The work of the Agrostologist has demonstrated very clearly the advantages of true perennial rye-grass so far as persistence is concerned. The work is being done in collaboration with the Agrostologist. Two trials have already been laid down, and others will be sown in the spring. The fields will be managed under the intensive system, and records of stocking kept for several years.

(3) Observational top-dressing of pasture: About 430 trials of this nature are under way. About 140 of these are in the North Island, and represent the trial and demonstration of the effect of manures according to district requirements. In Canterbury-Marlborough 240, and in Otago-Southland 50 trials are in progress. These are mainly experiments in which lime, phosphate, potash, and nitrogen are used. Most of the Canterbury series were laid down in the winter of 1928, and constitute a survey of the country to determine the chief limiting factors in pasture production. These trials have been highly successful in indicating several important features, the chief of which are—

(a) Lime is of extreme importance in something like 90 per cent. of the areas under trial. There can be no doubt regarding its economic value, even at the present unreasonable price, on the majority of Canterbury lands. The light lands of low rainfall have responded to an unexpected extent. The efficient production of ground carbonate of lime which would result in its being available to the farmers at about 12s. per ton (as in Southland) is urgently needed in Canterbury.

(b) Superphosphate has given good results (except on some of the very light lands) especially on limed ground.

(c) Potash appears to be of little general value. In a few cases it has shown slight improvement of the pasture on limed ground. It has practically no effect on unlimed ground.

(d) Nitrogen is of extreme importance, and has generally improved the sole of grass where used in conjunction with lime and phosphate. Its economic value must be the object of further investigation in the near future.