

C. *Experiments on Annual Crops carried out by Fields Officers.*

(1) *Wheat.*—(a) *Manuring*: A comprehensive series of manuring trials, consisting of twenty-five experiments in Canterbury and Marlborough and six in Otago, was laid down. The trial of superphosphate, muriate of potash, and nitrate of soda was continued. In addition, a number of trials with 1 cwt. and 2 cwt. of super with and without nitrate of soda were sown. The general results are as for previous years so far as the first-mentioned manures are concerned. The dry spring represented a condition under which nitrogen had not been tried previously. The results were quite satisfactory, and the Department is now in a position to recommend the spring application of soluble nitrogen to the wheat crops. On an average, a 5-bushel increase is to be expected from the use of 1 cwt. of nitrate of soda or sulphate of ammonia. This, on top of an average 5-bushel increase from super, means a 10-bushel increase over no manure. Potash is of little use, and is likely to depress the yield. The increased rate of sowing of super to 2 cwt. per acre does not give very good promise in the main.

(b) *Wheat-variety trials*: Three of these were carried out in Canterbury, and indicate the necessity of the trial of varieties on different soil-types. In one trial Major was 6 bushels better than Tuscan, while on another soil-type, it was several bushels poorer. A programme is arranged for the coming season in collaboration with the Wheat Research Institute.

(c) *Effect of hot-water treatment for control of disease on yield*: The trials of last season were continued, with very promising results. Three treated varieties were under test. The treated Tuscan yielded about 4 bushels per acre better than untreated; Hunter's treated was 2 bushels better than untreated; there was no effect with Pearl.

(2) *Barley.*—(a) *Manuring*: Three manuring trials were conducted in Canterbury and Otago. The results have shown extremely high response.

(b) *Hot-water treatment*: As for wheat. In 1928–29 the treatment had no effect, in 1929–30 the treatment gave a remarkable increase of about 7 bushels per acre.

(3) *Potatoes.*—(a) *Manuring early potatoes, Pukekohe district (Auckland)*: Three experiments were conducted in early-potato manuring and results have been published in the *Journal of Agriculture*.

(b) *South Island manuring experiments on main crop of potatoes*: The 1928–29 experiments showed a fairly consistent response to superphosphate and also to sulphate of ammonia. As an addition to phosphate, potash had little effect, except in South Canterbury and Southland. About twenty experiments were sown in 1929. The results of the experiments covering a period of three years will be summarized for publication this winter.

(c) *Certified versus non-certified seed potatoes*: Eight trials were laid down in the South Island to test the differences between a mixture of lines of certified potatoes and a mixture of lines of uncertified potatoes with each of four varieties. The superiority of certified seed has been most marked.

(4) *Swede and Turnip Manuring.*—Twenty-four experiments were carried to a successful conclusion in the South Island. Mixing equal parts of super and carbonate of lime eliminated the injury to germination, and this practice can be safely recommended to farmers. In the trials it usually gave a considerable increase in yield over super. Mixing can be done from several weeks to a day before sowing, and providing weather conditions are suitable for growth a good germination is assured.

(5) *Rape-manuring.*—Four experiments were conducted. As a result of adverse weather conditions the yield was poor. Germination of rape is affected by super, but not to the same extent as turnips and swedes. Where manuring at more than 1 cwt. per acre is practised it is advantageous to use a mixture of super + lime, or super + a slow-acting phosphate. Nitrate of soda applied about four to six weeks after sowing will increase the yield by 15 cwt. to 1 ton.

AGROSTOLOGY SECTION.

The research work of this section may be divided into two main branches: (1) Intensive critical research at the Plant Research Station; (2) field research in co-ordination with the Fields Extension Service of the Division and other specialist officers of the Plant Research Station.

*Work at the Plant Research Station.*—This concerns itself largely up to the present with strain trials in relation to grasses and clovers.

*Perennial rye-grass*: Approximately two thousand lines of rye-grass of commercial origin are under trial. The rye-grass strain work of 1929 can almost be regarded as an epoch in the rye-grass seed trade of New Zealand, and the elimination of the poor types and perpetuation of the good types will have a far-reaching effect on the swards of the Dominion.

*Cocksfoot*: One hundred and seventeen lots laid down in the spring of 1928 have been regularly mown and responses of the different types noted. Akaroa cocksfoot still maintains superiority over the Danish, both in total growth and persistency under weekly cutting.

*Brown-top*: One hundred and four lots laid down in spring, 1928, have been regularly mown all year. The type from the poorer and drier soil-types of Canterbury still continues to make an excellent turf, and it would appear that there is little danger of this type proving undesirable from a lawn-seed export trade point of view. For hill-country work, however, steps should be taken through certification to ensure that this form is not sold for secondary burns of hill country. Certainly for this purpose it is a less desirable type than the true *Agrostis tenuis* type.

*Yorkshire fog*: It has long been felt that this grass has a place for the grassing of second-quality lands, and a preliminary type study is being undertaken this coming year. Ninety-three lines from various habitats and sources have been sown in rows, and these will be used as material for preliminary single-plant-study work.