

The Botany Section, now established in Wellington, has engaged in two major investigations which have a bearing on economic problems—viz., ragwort and South Island tussock grasslands. The botanical characteristics of ragwort have been studied with a view to securing clues as to its control. These studies have revealed the remarkable capacity of the ragwort to regenerate from root fragments; the importance of abundant moisture-supply before seed germination occurs; that water, rather than wind, appears to be the main cause of spread; that plants have difficulty in establishing in a dense pasture sward; and that toxic sprays seldom injure the plant to such an extent that regeneration from roots will not occur.

The Agronomy Division is principally concerned with the arable crops of farm lands, and is located at Lincoln so as to permit of the closest collaboration with Canterbury Agricultural College and the Wheat Research Institute.

The Division has from its series of trials secured a great deal of new information regarding the field possibilities of Liral Crown pedigree linen flax, this flax variety being one which provides a high yield of high-quality fibre material. Investigations are being carried out in association with the Linen Industry Research Association of Great Britain and with the Department of Agriculture, for the purpose of ascertaining the possibilities of this crop as a basis for a linen industry in the Dominion.

Work on rape has resulted in the selection of very promising strains of both Giant and Broad Essex types, which are now keenly sought after by growers. With field peas and lucerne, selection and breeding work has made progress to such a stage that it will shortly be possible to release for commercial use improved varieties of both crops.

A new feature of the Division's work this year relates to horticultural crops, and an officer has been appointed to undertake this work.

The Entomology Division is located in Nelson for the purpose of ensuring close co-operation with the Cawthron Institute, where there is already a well-equipped entomological research station. The activities of the Division have, during the year, been centred largely on measures designed to control the two principal insect pests of rape and turnip crops—namely, diamond-back moth and white butterfly. Though two species of insects which preyed upon the diamond-back moth have been introduced, these have failed to establish owing to the presence in New Zealand of hyperparasites, and it was consequently decided that the Associate Director should proceed overseas for the purpose of studying this pest in its European environment, where apparently its ravages are not so serious as they are in New Zealand, owing, possibly, to its being controlled by other insects already well established there. The *Pteromalus* parasite of the white butterfly has not proved entirely satisfactory, as witnessed by the great prevalence of white butterflies during the 1937–38 summer. The question of the failure of the parasite to keep pace with the pest is being closely investigated.

The Division has a section at Lincoln College, where marked progress has been made in investigations relating to Hessian fly, the wheat bug, and the grass-stem weevil, while preliminary work has also been done in connection with the grass grub and the grass caterpillar.

The Grasslands Division at Palmerston North works in close association with Massey Agricultural College and with the Dairy Research Institute. The pedigree mother rye-grass seed resulting from a long period of careful selection and breeding has proved itself superior to all previous lines of true perennial rye-grass in the field trials under ordinary farm conditions located in various parts of the country.

The white clover produced by the Division has been a marked success, and work is now being directed towards the production of two distinct types, a smaller-growing one for sheep, and a more prolific type for cattle.

Selection and breeding is proceeding now on most of the principal pasture types in use in New Zealand. The pasture survey of the Hawke's Bay area has proceeded fairly rapidly, over half of the province now being completed in detail.

The feed-taint work done in association with the Dairy Research Institute has revealed the liability of any pasture containing over 30 per cent. white clover to cause taint in milk.

In order that the Division should keep well abreast of pasture research proceeding overseas, the Director was granted leave of absence for twelve months during 1937, and was given an opportunity of visiting Pasture Research Stations in Great Britain, Europe, and America.

The Plant Diseases Division is still located partly at Mount Albert, Auckland, and partly at Palmerston North. Ultimately, when the buildings are completed, the Division will be located at Mount Albert, Auckland.

During the year the Division, having made good advance with spray-testing technique, has issued certified lists of approved sprays, thus providing orchardists, importers, and manufacturers with valuable guidance regarding materials in use for pest control.

Considerable trials have been made with the growing of *Pyrethrum*, a plant which yields an organic insecticide of increasing importance. Some strains have been secured capable of providing a very high content of toxin.

Much attention has been devoted to devising measures for the control of citrus canker and citrus blast, the occurrence of which has only recently been reported in the Dominion.

Good progress continues to be made in the study of plant virus diseases, particularly those affecting the tobacco and potato crops.

A fungus responsible for the loss of vitality in Southland rye-grass seed has been traced, and at present its life-history is being worked out.

A careful survey of the rusts affecting cereal crops in the South Island is being made, as the possibilities of control depend very largely upon whether the species present in New Zealand pass through a sexual stage on some alternate host plant.