

Of the other problems mentioned above, the lucerne-flea, wheat insects, and cocksfoot-midge are outstanding. In the case of the lucerne-flea it has been decided to watch its development for a time before deciding whether special control measures should be undertaken against it. The wheat-insect survey shows that (at least during the period of the survey) the Hessian fly, stem-maggot fly, and Argentine weevil were not of very outstanding importance except perhaps for the Hessian fly in certain restricted localities; as with lucerne-flea, the development of these insects will be kept under observation. The cocksfoot-midge is apparently a major pest, though not universally so, influencing as it does a single type of localized crop. In regard to sheep blow-flies, there are indications that the major proportion of mortality amongst hoggets is due mainly to worm infestation rather than to maggot-flies, though the latter are epidemic during some seasons. The possibilities of the maize-seed beetle becoming a regular pest will be kept under review.

With limited staff it is necessary to concentrate on major problems and to guard against spreading activities over subjects which at the moment are apparently not particularly urgent.

AGRONOMY DIVISION.

(Director: J. W. HADFIELD.)

The headquarters of the Agronomy Division has now been permanently established at Lincoln, in close proximity to Canterbury Agricultural College. Facilities in the matter of finance, land and buildings, and assistance are more satisfactory than has been the case in the past.

The Agronomy Division is concerned directly with all phases of crop improvement, and this objective is approached by plant introduction, plant breeding, and pure-seed production. A recent addition to these activities has been effected by the appointment of an officer who is to specialize in vegetable crops.

PLANT INTRODUCTION.

This phase of crop improvement may be divided into two lines of activity. First, the introduction of new crops to New Zealand, and, secondly, the introduction of new varieties of those crops already grown in this country.

Linen Flax.—In the former class the most important item is an attempt to test the economic and agronomic possibilities of the production of linen fibre in New Zealand. From trials conducted during the past two seasons the agronomic possibilities certainly appear promising. The yield and quality of the fibre has also proved satisfactory and there appear to be no insurmountable difficulties attending the growing, harvesting, and decortication of the straw. It would seem, moreover, that very extensive areas in the South Island could with advantage be diverted to linen-flax production. The commercial aspect needs, and is receiving, particular attention, but it may be stated that the Russian and European economic policies have created concern as to future supplies of fibre for British manufacturers, who import 80 per cent. of their fibre requirements.

Soya bean.—During the last few years an attempt has been made to introduce the soya bean into cultivation. It has not been possible, however, to find any economic use for this crop in New Zealand. Trials are also being conducted with hemp, but possibilities in this direction are by no means as promising as are those in connection with linen flax, owing to difficulties of harvesting, processing, and seed production.

Other Crops.—Of those crops already grown in New Zealand, active endeavours are being directed to the introduction of varieties which may prove, in one way or another, superior to those already being grown commercially. Particular attention is being paid to oats, barley, linseed, lupins, potatoes, peas, and brassicas. The oat "Resistance" is becoming more widely grown, especially in Otago and Southland, on account of its yield and resistance to lodging. Anthony, Markton, and Huskless are proving useful introductions. Of the barleys, a wide range has been tested this past season and contains some promising material. The introduction of the Sweet Yellow lupin has been effected, and the potentialities of an alkaloid-free lupin may prove to be very great in New Zealand. Those varieties of potatoes showing promise overseas are introduced regularly, but the most interesting introduction of recent years has been of those species discovered originally in South America and which are being used extensively for breeding purposes. Certain vetches introduced some years ago, and found to be immune to black aphids, are being grown extensively under trial by orchardists as a green manure.

PLANT BREEDING.

Activities are being directed mainly to lucerne, oats, peas, potatoes, and brassicas.

Lucerne.—As a result of seven years' work on lucerne, the first strain is now being increased for seed production. It has arisen from selected progenies of the most promising crosses effected between plants which, on inbreeding, exhibited little or no reduction in vigour. A second strain is following this, having been built up from selected progenies of the most promising crosses effected between the best inbred families. Thus, the former has not been inbred, although selection has been based largely on the behaviour of inbred progenies. The latter is an attempt to combine the desirable features of homozygous inbred plants. Plot trials are being conducted simultaneously with seed production.