

(b) Single-plant Study: Twelve hundred single plants of Akaroa and Plains origin and thirty selected tiller-row plants of various types have been kept under observation, and notes kept on superior plants to date. No breeding-work has yet been attempted, but a close study has been made regarding the make-up of Lincoln College C. 23 selection, and ten best plants have been split up and planted out for seed-production in order to obtain a pure line of seed for field trials.

Brown-top.—Four hundred and six lots have been sown out, largely for certification purposes. Those sown in the spring failed to establish, and these have now been resown this autumn.

Prairie Grass.—Investigations in strain within this species have been commenced, twenty-four lots being sown out as broadcast plots, spaced rows, and single plants.

Phalaris tuberosa.—Twenty lines of *Phalaris tuberosa* have been sown as broadcast plots, spaced rows, and as single plants. The majority of these lines are of Australian origin.

Clovers: *White Clover*.—(a) Certification and other Trials: Six hundred and forty-eight lines were spring-sown, and the 845 lines sown the previous spring have been finalized. Herbage tests for HCN on all lines have been conducted by the Plant Research Chemist.

In the plot trials pedigree lines and the good Mother-seed lines are showing marked superiority in growth over all other types right from the time the seedlings commence growth.

(b) Elite-strain Work—Breeding: The original eighty-nine tiller rows and the 100 tiller rows planted in 1934 have been retained, and notes on these have been regularly taken.

In the early spring a total of 4,500 single plants obtained from crosses and selfings made last season were put out. Notes have been taken on these plants, but no selections have as yet been made from them.

From the crosses planted in 1934, 125 of the best plants from the six best families were selected for further breeding-work. These have been back-crossed to both parents, and also crossed in intra-family groups of five by isolating five plants of a family in a cage with bumble bees. In addition, six inter-family groups were made by isolating together ten plants from two unrelated families.

Eight original plants were selected from tiller-rows and diallel-crossed to furnish further unrelated families.

Seed-setting has been very satisfactory, and a further 8,500 plants are coming on for planting out in the spring.

Pedigree-seed Production.—There has been quite a wide distribution of pedigree white clover seed, and the area sown already runs into approximately 200 acres. A total of 38 acres is sown out from the nucleus area at the Plant Research Station, and a further 20 acres is to be sown out this spring. Owing to the exceptionally wet summer experienced, only a small acreage of the area sown was successfully harvested, approximately 400 lb. in all being harvested. This has now gone into commercial seed-production under certification.

Montgomery Red Clover.—(a) Certification and other Trials: Seventy-five lines were spring-sown, but type differences will not be clearly marked until the following spring. All lines previously sown have been reported on for certification purposes.

(b) Elite-strain Work—Breeding: In the spring 2,400 single plants were put out, and notes have been periodically taken, but no selections will be made until next season.

To obtain sufficient seed for plot tests of different types eight crosses have been made, and the seed will be sown in plots in the spring.

The original selection was culled and consolidated and attempts were made to secure a seed crop from this area. The adverse weather conditions throughout the summer reduced the seed-yield, and only 32½ lb. of dressed seed was secured. Sufficient of this to sow 3 acres under contract was released, the remainder being used for comparative field trials.

Subterranean Clover.—Good progress has been made with a study of strains of subterranean clover. Thirty-three lots were planted last May as spaced plants in blocks, and then the plants were allowed to spread and join up to form the equivalent of a broadcast plot. Regular notes and weighings have been taken, and important strain differences have been noted. The different strains fall into one or other of four groups if dates of flowering and seasonal growth are both considered:—

Group I is early-growing, early-flowering, and relatively low-producing.

Group II is early-growing, mid-season-flowering, and high-producing.

Group III is later-growing, mid-season-flowering, and only fairly good producing.

Group IV is very late to commence growth, late in flowering, and very heavy producing in the late spring.

The strains which come within Group II would appear to be the best for New Zealand conditions, since they are able to yield well in the early spring and in the early autumn.

This autumn a further twenty-four lots have been planted out for study, but only six of them are strains which have not been grown at the Station previously.

Seed-production.

Following on the results of strain-testing, nineteen blocks of single plants of the different strains have been planted in order to give increased supplies of seed for field trials and for later distribution commercially. The blocks are approximately $\frac{1}{100}$ acre in size.

Lotus Major.—The tiller-row trial has been continued, and late in the spring a selection of eight plants was put out in an isolated corner. The plants recovered very slowly after transplanting, and as a result did not flower this season. The selection is being kept for seeding this coming summer, and the seed obtained will be increase grown.

Two hundred and fifty L_1 plants obtained by selfing three original plants have been planted out, but no selections were made from these this season.