

Single Plant Study.—Four thousand single plants from the South Island and testing low under the ultra-violet-light have been severely culled, ninety-four plants remaining. These have been consolidated in a block for further testing.

Forty-eight of the best commercial lines from various sources have been sown out with the object of raising 10,000 single plants for selection purposes to augment those now used for pedigree seed production.

Tiller-row trials of eighty-four selected plants are being continued under a system of periodical grazing.

ITALIAN RYE-GRASS.

Certification and other Plot Trials.—One hundred and fifty-nine plots were spring sown, and have been reported on for certification purposes. It has been determined that late spring sowings give a very rapid indication of type owing to the marked differential behaviour of Western Wolths and Italian rye-grass when spring sown, the former bolting rapidly to seed-head and the latter tending to leafiness rather than stem. Inferior hybrid lots also show this tendency to bolt to seed when spring sown.

Elite Strain and Breeding Work.—In the early autumn of 1935, 5,000 single plants, obtained by selfing and crossing sixty-two selected original plants, were set out, and notes were taken periodically until last breeding-season, when 105 of the best plants from the eight best F_1 and L_1 families were selected. These plants were selfed and crossed in intra-family groups of four by enclosing heads from the four plants in a large cellophane bag. Seed-setting was good, and 8,400 seedlings have been planted out.

To furnish more information on the relationship between the production of single plants, rows, and plots, seed was collected from seven families of known type but showing an extreme range in type between families. The seed thus obtained was used for single plants, rows, and plots, together with three known controls—Western Wolths, certified Italian, and poor Italian lines. Each lot was replicated four times. They will be cut and weighed at intervals throughout the season.

Five thousand single plants from a number of lines of certified and imported Italian rye-grass were set out for comparative study and to afford a mass of material for selection purposes.

COCKSFOOT.

Certification and Plot Trials.—One hundred and forty-three plots were sown and all certification lots have been reported on.

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.

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.

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.

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.

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.