

AGROSTOLOGICAL SECTION.

(1) *Introduction*.—Field trials and farming experience have again emphasized the enormous value to New Zealand of “strain” in grasses and clovers as a factor to progress. Reports from the South Island from even the most arable districts are extremely encouraging, particularly from the point of view of the rye-grass strain used. New Zealand certified strains are being increasingly demanded. Plot trial, field trial, and farm-scale experience is also emphasizing the value of the New Zealand No. 1 white-clover type, and this fairly bids to rival certified perennial rye-grass in importance viewed from the point of view of strain.

A marked step forward in the year under review is the début of herbage seeds of a pedigree standard, some 220 acres having been sown out specifically for pedigree-seed-production purposes from seed originally bred at the Plant Research Station. Certain of this is grown on contract for the Department of Agriculture which will resell to interested merchants for seed-production purposes under certification.

The activities of the Station have been extended during the year in co-ordination with the Dairy Research Institute in the matter of our inquiry into the problem of feed flavours in cream and butter. Grassland research has a twofold scope: (1) The production of quantity and quality of herbage, and (2) the effects of such herbage as feed for animals and effect on animal products. Pedigree pastures demand a quantitative and qualitative measure, and the only satisfactory way of getting that measure is by means of the animal itself. The collaborative work with the Dairy Research Institute on the influence of feeds, fed pure and in mixtures, in particular reference to feed flavours in butter is a welcome commencement of this work. Plant chemistry is an integral part of such an investigation, and the close co-operation of the Plant Research Chemist is being fully utilized. The Chemistry Section is of very great value to agrostology, both in research and as a routine aid to type-determination for certification purposes, particularly in so far as white clover is concerned.

The following are the main activities of the Agrostological Section during the year:

(2) *Perennial Rye-grass*.—(a) Plot trials: The dry weather experienced during the past summer has emphasized and defined very clearly the relative qualities of various types of rye-grass. The following points have been most marked:—

- (i) The superior rust-resistance of the certified type over old pasture lines from Canterbury, Southland, Marlborough, and some from Wairarapa.
- (ii) In a block of spring-sown plots the whole area was badly infested by fat-hen. In the late summer, when this had died out, the New Zealand certified type was conspicuous by its good, dense, and even sward. British Indigenous types showed a very marked thinning-out of the sward due to slow establishment and consequent smother.
- (iii) In the main, Scottish, Irish, British Indigenous, and Australian lines have proved themselves to be definitely poorer than the New Zealand certified type.

(b) *Elite-strain work*: The block of $\frac{3}{4}$ acre of selected pedigree rye-grass was harvested for seed and yielded 762 lb. of roughly dressed seed. The major portion of this seed has been sown out locally on 20 acres for increase growing under contract.

The above yield will show how rapidly valuable stocks of seed may be increased. In 1934, 300 grammes were harvested; a portion of this (about 100 gr.) was sown out in a nursery-bed. Later some 33,000 plants were transplanted from this bed to the increase area of $\frac{3}{4}$ acre, from which 762 lb. of seed were harvested.

Owing to the very hot weather experienced during flowering-time this year's selection within the glasshouse set only a very small amount of seed. This has been sown out in boxes for later planting-out.

(c) *Relative yield of pedigree mother seed rye-grass, ordinary certified rye-grass, and British Indigenous rye-grass*: The following green-weights were taken on each of 100 plants of the following on 18th April, 1935:—

	Weight. Oz.	Relative.	Difference from Mother Seed.
Certified mother seed	591	100	..
Selection	1,175	199	+99
British Indigenous	303	51	—49

(d) *Low germination of rye-grass*: In an experiment designed to test the value of treating seed with hot water with the object of deciding whether or not any influence is made on the resulting seed crop no conclusive results were obtained. From other evidence it would appear that hot-water treatment has no beneficial effect.

A further experiment has been laid down at Winton and duplicated at Palmerston North. In this the problem is viewed from the strain point of view. A large number of as many strains as possible have been sown out. These will be harvested and germination figures determined.

(e) *Single-plant study*: Four thousand single plants (forty lines) of low ultra-violet testing South Island perennial rye-grass have been put out for selection and study.

(3) *Cocksfoot*.—(a) *Single-plant study*: Twelve hundred plants of Akaroa and Plains cocksfoot have been planted out for study. Up to the present no differences have been noted between Akaroa and Plains, but a marked non-uniformity of plant type in both Akaroa and Plains is noted.

(4) *White Clover*.—Selection of breeding of a large number of plants secured from different strains and the progress while a limited area of elite strains have been harvested and the seed sown for further augmentation of pedigree seed.

(5) *Red clover, subterranean clover, Lotus major, and Lespedeza* are undergoing strain trials designed to secure types suitable for New Zealand conditions.

(6) *Plant-breeding on material taken from the selection already made is proceeding in regard to perennial rye-grass, Italian rye-grass, white clover, Montgomery red clover, and Lotus major.*