Other Breeding-work.

(*a*) *Alkaloid of Perennial Rye-grass.*—Crosses have been made with the object of determining the mechanism of hereditary of the alkaloid with the ultimate objective of producing a perennial or hybrid rye-grass free or low in alkaloid.

(*b*) *Cyanogenetic Glucoside in White Clover.*—Further crosses have been made to study mechanism of hereditary with a view to production of a strain, free or low, in this glucoside should the results of feeding trials warrant such work.

(*c*) *Blind-seed Disease of Perennial Rye-grass.*—Four hundred plants of various lines were inoculated with the spores of the blind-seed disease under controlled atmospheric conditions to study relative degree of resistance of any plant or strains.

Strain Testing and Certification.

Two thousand one hundred and seventy-nine samples covering the following species, perennial rye-grass, cocksfoot, browntop, white clover, red clover, Italian rye-grass, timothy, subterranean clover, and *Phalaris tuberosa* have been sown for trial, mainly for certification purposes.

Species and Strains Trials.

In co-operation with the Department of Agriculture and, more recently, with the young farmers' clubs, species and strains have been laid down and reported on. In all, thirty-two standard trials were laid down in the present year. Numerous requests have been received for the popular "school" series of trials. Large-scale field trials have been made in Southland with British indigenous rye-grass and pedigree perennial rye-grass, while in Canterbury and Manawatu areas have been sown with short-rotation rye-grass.

Pedigree Seed-production.

Nucleus stocks of pedigree seed have been produced on an increased scale, harvestings during the present season comprising perennial rye-grass, Italian rye-grass, short-rotation rye-grass, type 2 white clover, Montgomery red clover, crested dogstail, and British indigenous rye-grass. Single plants have been raised in the nursery planting new areas of the latest selections of perennial rye-grass, Italian rye-grass, and short-rotation rye-grass, pedigree white clover, type 2 white clover, and Montgomery red clover. A broad red clover selection has also been made and will be increased for seeding next season.

Plant Introduction.

A further fifty samples of various species have been received and raised in the nursery for general observation and seed-production or for chemical analysis. Small plots of one hundred and fifty recently introduced species were sown down in the autumn and subjected to grazing. Data were taken on palatability, growth, and recovery from stock grazing. *Agropyron* sp. did not germinate favourably under autumn conditions, but when spring sown produced a good ground cover.

Blind-seed Disease.

The perennial rye-grass increase areas were particularly free from infection with the blind-seed fungus. One block has 10 per cent. infection and the main block 2 per cent. infection. This latter area carried a heavy crop, which lodged badly, completely covering the soil surface, a factor which would prevent the dissemination of spores from the rupturing apothecia. Undoubtedly the low percentage infection was also due to the favourable climatic conditions during the flowering and seed-ripening period.

The date of closing the crop for seed appears to have some influence on preventing heavy infection. To confirm this observation, blocks of a paddock were closed at weekly intervals over a period of ten weeks from the beginning of October. The whole paddock was given four manurial treatments, so that the yield from each block was affected by date of closing and manurial treatment. Data have been collected and will be analysed.

Manurial Trials on Seed Production Areas.

Various mixtures of artificial manures and organic manures were applied to grass-seed crops to determine the value of organic manures such as blood-and-bone, dried blood, and their combinations with super and sulphate of ammonia in increasing the seed-yield.

SUBSTATION AT LINCOLN.

Work has been continued at Lincoln, where collateral tests with those conducted at Palmerston North on selected and bred material have been continued. Five acres of nucleus stock Italian rye-grass yielding some 164 bushels, and 2 acres of short-rotation rye-grass yielding 76 bushels of dressed seed, were successfully grown and harvested by the Agronomy Division.

Reciprocal service at Palmerston North on behalf of the Agronomy Division has been continued at Palmerston North.

FIELD ECOLOGY.

Pasture Surveys.

The pasture-survey work suffered a very grave set back in the recent fire, the whole of the maps and records in connection with the Matakaoa County, Banks Peninsula, and Central Hawke's Bay being lost. An effort is being made to resurvey the Central Hawke's Bay area, but surveys of Banks Peninsula and the Matakaoa County will remain in abeyance until the end of the war.