

has now been reached when most of the certified seed of perennial rye-grass, timothy, white clover, Montgomery red clover, and cow-grass, and all Italian and short-rotation rye-grass, is of pedigree origin.

Pasture trials are being continued at Palmerston North, Lincoln, and Gore to compare the performance of pedigree strains with that of the best New Zealand and imported strains.

Preliminary investigations on the possibility of breeding improved strains of other species are being carried out. The variability in New Zealand and imported lines of *Lotus uliginosus* and *L. corniculatus* is being studied. Information is being obtained on the reproductive mechanisms of these species and of strawberry clover as a guide to the most desirable breeding technique to use in any plant-breeding work with them. The study of some 2,000 individual plants of Yorkshire fog selected from a hill-country pasture at Te Awa has shown the extreme variability between plants of this species in such characteristics as vigour, leafiness, rust susceptibility, time of flowering, growth form, and longevity.

To provide information on aspects of plant-breeding techniques with cross-pollinated plants, an experiment has been carried out on a comparison of various systems of progeny testing with *Lolium*. The value of the progeny test by open-pollination in an "increase area," as a method of testing the combining ability of selected plants, was shown.

STRAIN ECOLOGY

Nucleus Seed Production.—For some years nucleus seed of perennial rye-grass, Italian rye-grass, short-rotation rye-grass, white clover, Montgomery red clover, and cow-grass have been produced, and recent additions to these are nucleus timothy and nucleus cocksfoot.

Seed Certification.—The seed certification scheme ensures that the advantages of the nucleus selection work are maintained year after year. The number of plot tests required in the operation of this scheme this year amounted to 9,083, a slight increase on last year's figure of 8,994.

Plant Introduction.—Approximately 100 samples of grasses and legumes have been introduced for trial during the year. These have come from America and Europe, and have been obtained through the plant introduction service of the Botany Division. In the course of the trials extending over a number of years some 700 samples have been grown but only 228 distinct species have been represented. These are being grown at Palmerston North on rich alluvial soil, at Himatangi on sand country, and in wind-eroded hill country in parts of Hawke's Bay and in Poverty Bay. Many of the species introduced do not succeed, but there are a few species which show promise of being useful.

PASTURE ECOLOGY

Trials to Compare Pasture-management Systems.—There has been a drop in production on the complete special-purpose pastures of the farmlet trials owing to loss of red clover through the excessive water of last winter and *sclerotinia* damage. On the other hand, the block using a rotation of summer crops (chou moellier and rape) and special-purpose pastures has produced better than the others owing to a favourable season and the influence of the newly-sown red-clover paddocks, which normally produce well for the first two seasons.