

Other single plants studied include plants for a comparison of first-harvest progeny and plants from the original lines. The progeny from a certified mother-seed line showed very small variation in type from the original line, but that once grown from a Kentish line had become contaminated with 12 per cent. of the "ordinary" New Zealand type.

Elite Strains.—The 5-acre block drilled in at the Pure Seed Station at Lincoln has produced a good crop of seed, which has been distributed to purchasers.

The $\frac{3}{4}$ -acre increase block of plants from the 1933-34 glasshouse selection yielded 244 lb. of dressed seed. Contracts have been let for increase growing 38 acres of clover sown with this seed. Some of the surplus seed has been sold as Government pedigree stock seed, and some has been used in field experiments recently laid down.

An increase block of plants from the 1934-35 glasshouse selection is being planted out to provide nucleus pedigree stocks for 1936.

RED CLOVER.

Certification Trials.—One hundred and fourteen plots were sown in the spring, but as most of these failed to establish on account of the dry summer season eighty-three lots have been resown this autumn. This failure in establishment has delayed the issue of reports. All the previous year's lines have been finally reported on.

Single Plants.—Notes were made on the 1,100 single plants out of mother-seed lines and their "once grown" progeny. So far the "once grown" lines show little deterioration of type or contamination with other types.

All the single plants, including those just mentioned, were trimmed back before coming into full flower. Heavy mortality of plants during the extremely dry summer period followed this cutting back.

The blocks of plants from controlled crossings have shown remarkable uniformity of type and growth. Twenty of the best of these plants were seeded in the glasshouse this year, but only a small quantity of seed has been obtained.

Forty-eight plants were selected from the 1,100 plants from Station-grown lines and subjected to breeding tests.

Elite Strain.—Plants from the 1933-34 glasshouse selection were planted out in a $\frac{1}{2}$ -acre increase-block and seeded this summer. This yielded 140 lb. of "nucleus pedigree stock seed." Fourteen acres have been sown with this seed on contract to the Department.

SUBTERRANEAN CLOVER.

Thirty-four samples have been received for testing. These are being grown in rows, and single plants of thirty lots are being put out also for a study of strain differences.

LOTUS MAJOR.

The fifty-four single plants selected from the original block of 1,600 plants have been established in a tiller-row trial. In the spring eleven plants were selected from these rows for testing under selfing and crossing as a preliminary to building up a pedigree line.

ODD SPECIES.

Samples of species of *lespedeza* have been received for trial. These included Korean *lespedeza*, Harbin *lespedeza*, and *Lespedeza sericea*. The first-mentioned is the only one that made much growth, but this was coarse and woody and could not compare with a plant like lucerne.

PLANT BREEDING.

PERENNIAL RYE-GRASS.

The perennial rye-grass material used in this season's plant-breeding work comprises—(1) The six nucleus plants used as the parents of this year's glasshouse selection. They have been selfed and crossed with two plants (type 1 and type 3) of which we have some information as to segregation of important characters. (2) Twelve L1 plants from the most promising L1 generation available have been selfed and chain-crossed. (3) Twelve F1 plants from the best cross produced in the 1932-33 season have also been selfed and chain-crossed. (4) Sixteen selected plants from a high winter-producing line have been selfed and crossed in pairs.

Most of the selfing and crossing was carried out in the glasshouse, where cellophane bags were used as the isolating material. However, to provide information on the value of isolating in the glasshouse as against bagging in the open, sixteen plants were also selfed and crossed in the field by using parchment sleeves over wire frames. Although the parchment sleeves were not adversely affected by weather conditions it appears that most reliable results can be obtained from working in the glasshouse, and it is therefore proposed next season to carry out as much of the work as possible under glasshouse conditions.

The seed-setting from both selfings and crosses has been good, and 6,800 seedlings are now planted out as spaced plants in boxes.

ITALIAN RYE-GRASS.

The Italian rye-grass material used this season has been selected from the two most uniform and outstanding lines available at the Station.

Sixty-six plants have been selfed and crossed in pairs. Owing mainly to adverse conditions the seed-setting was not as high as might be expected, but, nevertheless, sufficient seed was obtained to provide one hundred seedlings from most of the crosses. In all, 5,000 seedlings are at present planted out as spaced plants in boxes.

WHITE CLOVER.

The white-clover crosses have been made by pairing plants in the presence of bees in cages placed in the open. Humble bees have been found to be very suitable for this purpose, and practically all of the plants have set ample seed.

The most promising white-clover plant available at the Station has been used for pairing with thirty-six other plants with the object of obtaining good combinations of character as well as for testing the material available. Nine miscellaneous crosses have also been made by pairing good plants.

Eleven F1 plants have been selected from an outstanding F1 generation and chain-crossed, while four F1 plants from another cross have been back-crossed to both parents.