

With the object of increasing this line rapidly,  $\frac{3}{4}$  acre has been planted out with 31,000 spaced single plants raised from this line. This block will be harvested for seed next season.

For seed production from young plants it is essential that they should be put out no later than early winter. If put out later on in the spring the plants do not "age" sufficiently to produce a normal seed crop that autumn.

A second glasshouse was planted out with tillers of six plants of a high winter-producing but shorter-lived type. The same difficulties as encountered in the other house regarding late planting and humidity were experienced with this lot. A poor yield of 1 bushel per acre was obtained. This line does not appear to be very promising, but a block of 2,500 plants has been put out for observation and increase.

*Genetical Work.*—In single-plant study crosses made in 1932-33 with plants of various types show, on the whole, a lack of uniformity within each cross. Perennial crossed with Italian and the reciprocal give plants of a very undesirable type, being mostly similar to bad false perennial. One or two crosses of good plants show a fair degree of uniformity, and these plants will be useful as parent plants for building up improved lines.

In 1933-34 crosses of various types of plants were made in pollen-proof cages. The amount of seed set was very small and in many cases nil. This may be accounted for by the fact that plants were planted in the ground and not in pots as was done last season, thus making it difficult to have pairs of plants flowering at the same time. In at least one of the crosses there is evidence to show that self-pollination occurred. This self-pollination reduces the value of attempting mutual pollination.

An endeavour made to self-pollinate all plants that had been used in crosses has, on the whole, been quite successful. Plants that had been in pots for fifteen months and for three months were pollinated with equal success. It was thought that failure of last season's attempt at selfing might have been due to using plants that were potted too recently and which grew a great deal more leaf than plants which had been in pots for more than a year.

A further lot of forty-seven single plants was put out in this season. The older block of 168 plots has been reseeded and reduced to thirty-seven plants. By the time single plants have been in position for from eighteen to twenty-four months they become very high in the crown and do not thrive. It is then necessary to lift and replant them several inches deeper than they were. This encourages more healthy tillering and a more natural habit.

*Continuous Harvesting of Areas.*—In an endeavour to decide what effect several consecutive harvests have on the plant-type constitution, an area of some four thousand single plants representing crops from ten areas which had been harvested for three or more consecutive seasons have been planted out. Notes on plant type and rusting have been taken. No conclusions can be drawn at present, as differences, if any, are very slight, there being no obvious deterioration.

*Investigation into the Cause of Low Germination of Rye-grass.*—A block consisting of 268 rows of rye-grass made up of a number of lines of varying germination and treated with hot water at different temperatures was harvested. No information on this season's harvest is available, but results from a similar experiment last year are not encouraging. The weather at flowering-time was unsuitable for the development of the fungus, so little information is expected.

#### ITALIAN RYE-GRASS AND WESTERN WOLTHS.

An important factor entering into testing Italian rye-grass the season in which they are sown. If sown in the autumn both types develop at approximately the same rate and differences do not show at all well except that the Western Wolths is more upright and vigorous. But if they are sown in the spring the Western Wolths type runs up to seed and dies very quickly, while the Italian is considerably slower in maturing, and, if sown late, the death-rate is very low in the first season.

The position of commercial Italian rye-grass in New Zealand is very unsatisfactory from a type point of view, there being very little Italian of a good type on the market. Of the samples tested so far very few lines are wholly of a good Italian type, the majority being very mixed and ranging from Italian through Western Wolths to lines wholly false perennial. Several imported lines that have been tested have proved to be of a good type of Italian. These lines are being increased under certification.

*Plot Trials.*—Plots and rows numbering 189 have been sown this year. It is considered that testing in plots is more satisfactory than testing in rows, as deaths and growth forms are much more noticeable in the former.

*Elite Strain Work.*—Twenty-four of the best plants were put out in the glasshouse for seeding under controlled pollination. About ten thousand plants of this line have been planted out for observation and increase. Single plants numbering 7,479 from good lines have been put out with the same object.

#### COCKSFOOT.

*Certification Trials.*—This year 280 lines of cocksfoot have been sown. All spring-sown lines have been reported on. In rows sown last autumn, differences, in some cases, have been noticed between Akaroa and Plains lines, the latter being more vigorous. This point is being investigated more thoroughly. In the last spring sowings the Danish type showed out very markedly within eight weeks from time of sowing by virtue of its very rapid seedling growth.

*Elite Strain Work.*—To enable further tests to be made an area of 0.065 acre of Aberystwyth "pasture type" was sown out for seed production. This gave quite a good yield of 392 lb. per acre. Trials to date with this type indicate that it is likely to be of very little value in New Zealand on account of its low total production and slowness to start growth in the spring and its winter dormancy. Twelve of the best single plants available were put out in the glasshouse for controlled pollination. Little or no seed, however, was produced this year.

*Single-plant Study.*—Plants representing the various types of cocksfoot have been put out as tiller rows and single plants. Very wide differences have been noted from the dense leafy type to the squat, open-crowned, winter dormant type.

#### BROWN-TOP.

*Certification.*—Owing to an unsatisfactory strike all of last season's lines have been resown on better soil. No reports have been furnished.

*Elite Strain Work.*—This is being carried out in connection with the greens research work.

*Agropyron Species.*—None of these species which are advocated in American papers appears to be of any value in New Zealand either as a lawn or pasture type. *A. Smithii* is a possible danger on account of its twitchy habit. All species are of fairly low palatability.