

(6) *Small-fruit Diseases*.—(a) Tomatoes: The fungi responsible for “damping-off,” and the virus disease responsible for narrow-leaf have been determined. It was found that mosaic was readily transmitted from diseased to healthy plants in the process of removing laterals. Tests have shown that fruit-yield may be decreased by as much as 36 per cent. through attacks from mild mosaic.

(b) Strawberries: Several strains of virus-free plants have been produced, and are available for bulking for commercial distribution.

(7) *Grass-diseases*.—Control of red-thread, a fungous disease troublesome on lawns, and brown-patch, both of which are due to *Corticium* sp., are under investigation. The fungous responsible for impairing the germination of rye-grass seed has been isolated, and is now being made the subject both of laboratory and field investigations.

(8) *Miscellaneous*.—The effects of molasses, bacterial cultures, and whey in the production of quality silage are being investigated. Preliminary work has indicated that silage production may be standardized and simplified by the use of certain of these agents.

Experiments dealing with the control of moulds on the woodwork of dairy factories and meat-works are partly completed. This work is being designed to check the spread of organisms responsible for the deterioration of meat and dairy-products. Associated with this has been an examination of sterilizing-compounds, suitable for treating woodwork. It has been shown that chlorine compounds, so generally used for the purpose, have little, if any, toxic effect upon the moulds present.

AGROSTOLOGY SECTION.

The work of this Section has been largely concentrated upon the significance of strains in the main pasture grasses and clovers. This has involved a large amount of plot experimentation and hybridization.

(1) *Perennial Rye-grass*.—Comparative tests of New Zealand certified strain rye-grass against English, Irish, Australian, and South Island lines have again proved the superiority of the first-named. With the exception of one or two Australian lines, all of these are definitely inferior to the certified strains. This inferiority was particularly marked insofar as liability to rust attack was concerned. Many of the imported lines under test were up to mother seed standard when tested under the screened ultra-violet light.

The field experiments show the absolute necessity for plot tests when the history and origin of the line in question is not known.

For the first time it has been possible this year to commence work on the preparation of elite strains. This has been carried out in the newly erected glasshouse, where tillers of six selected plants of a high-producing perennial type were planted out, and self-pollinated. As a result, sufficient plants have been secured to plant out $\frac{3}{4}$ acre of this elite strain. This will enable the value of the strain to be subjected to preliminary test.

(2) *Italian Rye-grass*.—Studies are being made of Italian rye-grass and Western Wolths, in order to ascertain the differences between these two strains. It is apparent that the position of commercial Italian rye-grass in New Zealand is very unsatisfactory from a type point of view. The samples tested so far have revealed few which are wholly of a good Italian type, the majority being very mixed, and ranging from Italian through Western Wolths to lines comprised wholly of false perennials. The availability of glasshouses has now enabled elite strain work to be put in hand immediately in the case of Italian rye-grass.

(3) *Cocksfoot*.—For certification purposes some 280 lines of cocksfoot are under observation, and attempts are being made to select strains from Akaroa, Canterbury Plains, and Danish type, which are likely to be worthy of further propagation in New Zealand.

Aberystwyth pasture type cocksfoot was this year sown out for seed-production, and gave a very good yield of seed, but the type appears 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 almost complete winter dormancy.

Certification and strain work is also being carried out with brown top.

(4) *White Clover*.—Selection is still proceeding in connection with white clover, during the year some 6,200 plants being under observation. An elite strain, selected from varieties grown at the Station, has been propagated at Lincoln and trial plots have shown that it is superior to any commercial mother seed at present available.

Hydrocyanic-acid tests have shown that high acid content and high-quality strains correlate very closely, and that this test is likely to prove most useful in determining white clover types.

(5) *Red Clover*.—Strain-selection work with red clover is progressing, and over three thousand selected plants are now under examination. A large number of imported plants from the Welsh Plant Breeding Station are also under observation, and comparisons are being made with those secured in New Zealand.

Similar work is proceeding in regard to subterranean clover and *Lotus major*. An inspection of pasture swards established in newly developed areas of pumice land have shown that certified seeds are playing a particularly important part in the pasture development of this class of country, and that these types are giving an excellent response to top-dressing.

(6) *Green-keeping Research*.—Investigations made during the year indicate the great difficulty which is being experienced in maintaining the thriftiness of the sward on bowling and putting greens, resulting from close and continuous mowing even though artificial manures are liberally supplied. This practice results in starvation, due to overpruning, and it serves to emphasize the importance of endeavouring to arrange for pasture maintenance through a rational system of rotational grazing, rather than under a system of close and continuous cropping.

Arsenic pentoxide and sulphate of ammonia have shown themselves to be the best materials for the control of weeds and clovers on greens. The outstanding grasses for green development have shown to be brown top, Chewings fescue, and velvet bent. Of the latter grass, strain selections are now being made, with a view to still further improving the standard obtainable by the use of this grass.