

Three typical plants of the Kentish type have been crossed with the type plant which has been most used in breeding-work and about which we have most information. The three Kentish plants have also been group-pollinated to test their breeding behaviour as regards type.

To provide some information on the variability in type of three quite distinct sub-types occurring within type 1, three to five plants of each of these three sub-types have been isolated together.

In addition to the crossing-work undertaken, five plants have been self-pollinated by isolating with bees in cages. The self fertility of these plants varied between 0 and 14.3 seeds per head.

From the white-clover crosses a total of 3,700 seedlings are at present pricked out in boxes.

MONTGOMERY RED CLOVER.

As with the white clover, the Montgomery red clover has been crossed in cages in the open. Forty-six selected original plants have been crossed in pairs, and also twenty plants from the three most promising F1 families. The seed-setting has been quite satisfactory, and 2,000 seedlings have been planted out in boxes.

LOTUS MAJOR.

The same method of crossing as with the clovers has been used for *Lotus major*, but the seed-setting has been rather variable. Eleven selected plants have been selfed and chain-crossed, and 1,300 seedlings are available.

GREEN-KEEPING RESEARCH.

Selections of promising lawn-grass species have been made. The selections, *Agrostis canina*, are now planted out as single plants. Seed has been harvested from these and a further area has been planted out.

The manurial trials have been continued. The differences due to manuring are extremely wide, and more work on this subject is required.

Soil acidity, pH determinations, on differentially manured plots are being made. Increase of soil acidity and reductions in same can be brought about by application of different fertilizers. Good turf can be produced on soils which vary greatly in intensity of acidity.

Experiments in turf establishment by the stolon method have been commenced with fair results.

A trial in returfing of a green proved that the method is satisfactory in all respects.

Furtherwork in control of various pests has been undertaken. The control of grass-grub, *Porina* caterpillar, earthworms, weeds, and fungus diseases of turf has been continued. Results to date are satisfactory, and in most instances confirm previous findings.

The second annual report on green-keeping research was written and published during the year under review. Lectures and demonstrations to green-keepers were given at their conference.

FIELD TRIALS.

A comprehensive series of strain trials was made up for demonstration purposes by the Instructional Service of the Fields Division. Sixty-three such trials have been made up and sent out during the year.

In addition, small-scale trials consisting of twenty lines have been sent out to 112 schools. These are accompanied by detailed instructions regarding how to sow, what to look for, and how to record any observed difference. A charge of 2s. 6d. per set is made.

GENERAL ECOLOGICAL WORK.

Point analyses and seasonal notes on the composition of pasture trials at Marton have been made. Also analyses of cut herbage on a percentage-weight basis have been made with a view to determining the actual seasonal contribution of each species or strain sown in the mixtures. Pasture inspections and analyses in connection with pasture-development work with the Dairy Research Institute and Massey Agricultural College have been done in the laying-down of pastures, seed mixture trials, &c.

FEED FLAVOUR IN BUTTER INVESTIGATION WORK.

This has been conducted under the direction of Professor Riddet, Dairy Research Institute, in collaboration with the Morrinsville Dairy Co. (Mr. Stirling), the Fields Division, and the Dairy Division of the Department of Agriculture. Forty farms were inspected and botanically analysed, and these were placed roughly into four main groups. The night and morning cream from these forty farms was graded on a 0-10 basis from a feed-intensity flavour point of view, and results were then correlated up with botanical composition of the farms.

The following points have been demonstrated: (1) Evening cream shows a feed intensity 3.6 times greater than the morning cream; (2) the grass-dominant farms tend to be mild in feed flavours, and no feed flavours at all are in evidence where non-luscious grassiness predominates; (3) clover dominant farms may give a high feed-flavour intensity, and this may be given by white clover, red clover, suckling clover, or lucerne; (4) young luscious growing herbage gives a greater intensity of feediness than older and more matured herbage of the same species; (5) weeds are not responsible for the general "tang" under investigation, but specific weeds may give rise to specific flavours.

The investigation to date points to modification of pasture management as a means of lessening feediness.

Fundamental work to arrive at the actual causative factor of feediness has been instituted in collaboration with the Dairy Research Institute at Palmerston North. The following areas have been sown out for grazing purposes and for stall-feeding in measured amounts, pure and in mixtures: (1) Perennial rye-grass, (2) Italian rye-grass, (3) cocksfoot, (4) white clover, (5) Montgomery red clover, (6) broad red clover, (7) suckling clover, (8) subterranean clover. These will be available for trial during the next spring.

DEMONSTRATIONS, LECTURES, AND CORRESPONDENCE.

Visits of the public to the Plant Research Station have been frequent, and this absorbs a good deal of time. It is, however, usually good time well spent. Lectures to outside organizations were given during the year.