

EXPERIMENTAL WORK.

Testing of Highly-coloured Varieties.—Scions of varieties, principally Delicious and Jonathan of outstanding colour, were collected from various districts and grafted on to bearing trees at the orchard for testing purposes and have made satisfactory progress.

Cider-apple Varieties.—The New Zealand Fruitgrowers' Federation imported twenty-four trees of cider-apple varieties, and these were planted at the Research Orchard for testing purposes.

Manurial Experiments.—The work on the manurial trial plots has been kept up to date.

Cold-storage Trials of Fruit from Manurial Plots.—Fruit for cold-storage trials has been selected from the various manurial plots and stored at Stoke Cool Store. This fruit will be examined and recorded in due course. Special packs of Cox's Orange have been forwarded overseas to investigate the incidence of bitter-pit, and the testing of oiled wraps has been carried out on eleven varieties of apples, several of which have been prepared from the Research Orchard.

Spraying Experiments.—A variety of spraying experiments have been worked in with the general spray programme during the spraying season and provided much valuable information relative to black-spot control and russetting of fruit.

Improvements.—During the winter the spraying system was improved by the replacement of $\frac{1}{2}$ in. piping with $\frac{3}{4}$ in. piping, which greatly facilitated the work of spraying. This change was no doubt responsible for the cleaner fruit crop this season, as although the weather conditions during spraying-time in the early summer were very unfavourable, black-spot was kept well controlled.

ORCHARD SURVEY.

In conjunction with the Land Utilization Survey that is being undertaken in the Hawke's Bay district, an orchard survey has been carried out in an attempt to correlate tree performance and soil type. Much of the field work of the survey has been completed, but the data obtained have not yet been analysed. It is evident, however, that faulty drainage and indifferent management override unsuitability of soil as the chief cause of orchard failures on the Heretaunga plains. After making allowance for these disturbing factors it is hoped that there will be sufficient evidence to indicate the most suitable soils for the various types of fruit. The relationship of soils to individual varieties of each fruit appears to be rather obscure, the position being complicated by the fact that a common stock has been used for most plantations, and also by the management factor which produces wide variations within any variety on a given soil type. In addition to observations of the aerial parts of the trees, root excavations have been carried out on the major soil types. Marked differences in rooting system have been found, the limiting factor in root growth being the level of the water-table.

SPRAYING INVESTIGATIONS.

A full programme of experimental spraying was commenced on the Havelock North orchard, but the severe frost in October, 1936, destroyed practically the whole crop. The absence of fruit made it impossible to obtain complete records, but most of the schedules were continued to keep the orchard reasonably clean, and to determine their effect on foliage.

Black-spot.—Experiments on black-spot control showed that the "weak Bordeaux and summer-oil" treatment, at present being advocated by a proprietary firm in New Zealand, is quite useless where black-spot infection is high.

Summer Bordeaux $1\frac{1}{2}$ –3–50, which at present is extensively used in Auckland, was compared with the standard lime-sulphur plus colloidal-sulphur programme. Although slightly better control of black-spot was obtained with the former during this abnormally wet season, spray damage to fruit and foliage was considerably higher.

Codling-moth.—Standard spray treatments for codling-moth control yielded indefinite results owing to low incidence of infection.

Bronze Beetle.—Several different spray treatments for control of bronze beetle were tried on an area where infestation was particularly severe, check trees showing 100 per cent. of the apples damaged. None of the treatments gave commercial control under such conditions of high infestation, the most successful results being obtained with sprays applied at weekly intervals from petal-fall up to early December. Consequently, such additional measures as cultivation of the soil, &c., are necessary to reduce the severity of infestation.

Arsenical Substitute.—Preliminary experiments with a proprietary substitute for lead arsenate (Thiox) indicated that at equivalent weights it is not as effective as lead arsenate and under certain circumstances more likely to cause plant damage.

Brown-rot of Peaches.—Low infection of the check trees again prevented definite results being obtained. Preliminary experiments on dips indicated that it may be practicable to effect considerable reduction in the loss of fruit from brown-rot during transit and in storage.

Spray Coverage.—Experts have demonstrated that inefficient methods of application limit disease control in many of the orchard areas in Auckland.

The final series of articles dealing with spray coverage are in course of publication.

Tomato-mite.—In conjunction with Mr. Cottier, the distribution and life-history of the tomato-mite, an outbreak of which recently occurred in Auckland, is being investigated. Experiments have shown that the mite can be controlled by fumigation with nicotine.

White Wax Scale.—In conjunction with Mr. Cottier, work on the life-history and control of white wax scale is being carried out preliminary to attack by sprays.

Mottle-leaf of Citrus.—Applications of zinc sulphate have been made to a few lemon and orange trees showing leaf-mottling of a type similar to that found in the United States of America and which has been controlled by applications of this chemical.