Citrus Bud Selection and Variety Tests In New Zealand

Do you know that New Zealand imports more than 500,000 cases of citrus fruits annually? Is this necessary? We have some good quality local grapefruit and lemons, and are searching for a variety of local sweet orange and mandarin which does well in the Dominion. Do you realise that every sweet orange growing country had to evolve its own particular varieties suitable for local conditions, and that the industry became successfully established only when such variety was discovered? Are you going to assist this work of finding the most suitable variety and improving our lemons, oranges and New Zealand grapefruit by careful bud selection?

IN the past the propagation of citrus trees has been done by seed, cuttings, layering, budding and grafting. To-day the standard method is by budding, a system of vegetative reproduction whereby the young citrus tree retains the characteristics of the tree from which the original bud was taken. The selected bud is inserted into one of the standard root-stocks for citrus trees, namely the sweet orange (*Citrus sinensis*), the Rough Lemon or Citronelle (*Citrus limonia*), the trifoliate orange, (*Poncirus trifoliata*).

Although rootstock and general environmental factors have a considerable influence on the development of the young citrus tree, trees planted out on the same rootstock and within the same environment differ widely. In every commercial citrus orchard to-day, there are many qualities of trees both in vigour of growth and in the quality and quantity of fruit produced per tree. This difference is largely due to the variation in the original buds from which trees were propagated.

The citrus grower in the past has paid too little attention to the selection of his original trees, and when, by experience, he learns of his mistakes he may have spent many years of hard conscientious work on inferior trees. Not only should rootstock seedlings be severely culled, retaining only the strongest, but also the best available citrus buds should be budded on to those rootstocks.

The work of finding the best buds available is known as bud-selection. This requires the observation and whole-hearted co-operation of every citrus grower as well as that of every citrus nurseryman. Generally, citrus trees have been propagated from the best available material known to the propagator, but the individual person who was propagating the trees has been limited in his choice by limited knowledge of trees available. Formerly buds were selected from one variety and at a later period selection was mainly confined to the strain within the variety, whereas to-day buds are, in the main, or should be, selected from the best trees or best portions of trees of a superior strain of a variety.

Citrus bud-selection work has been carried out in other parts of the world, and the work of A. D. Shamel and his co-workers in the United States is well known. Similar work has been undertaken in New South Wales, and the necessity for such bud selection has been recognised in New Zealand for some years. In order to put citrus bud-selection on a sound basis and to co-ordinate past work, it is suggested that each individual grower become an observer and report to the Orchard Instructor and Citrus Growers' Committee for the locality trees of outstanding merit for quality and quantity of crop in the orchard.

Having selected the outstanding trees, it is proposed that fruits be assembled and exhibited locally from these trees and then forwarded to the Central Bud-Selection Committee for its selection and comments. All selected trees would be marked and cropping record for the next three years obtained. At the end of this period there should be some reliable data in each district. It is recommended that no buds should be cut before the end of the three-year trial period.

When definite proved trees have been secured after the trial period it is proposed to arrange for the securing of the buds and the supplying of nurserymen with them on conditions to be later agreed upon, and also to plant out bud-selected trees and encourage intending planters to inquire for trees, using such tested and selected buds.

Using Bordeaux Mixture

FUNGOUS diseases of crops cause serious annual losses. Once the crop is seriously affected, control of disease is not easy. The plants may be coated with a protective film which, if complete, prevents the entry of disease organisms into the plants. For this purpose Bordeaux mixture applied as a spray and allowed to dry on the plants is satisfactory with many plants, but every portion of the plant above the ground must be coated, and the covering must be renewed as the plant grows and as the Bordeaux loses in effectiveness.

It may be necessary to spray at from 10- to 20-day intervals, or more frequently when warm humid conditions occur. Under the latter conditions the plant grows rapidly, the film of spray deteriorates readily, and infection by fungi is likely to be more serious. The spray should be applied when the plants are dry, and early in the day so that it dries. A dull but fine day without wind should be selected for spraying.

Bordeaux mixture is prepared from copper sulphate (bluestone) and hydrated lime (slaked lime). Both ingredients may be obtained from good hardware stores and seed merchants. The copper sulphate (crystals or powder) costs about 8d per lb, and the hydrated lime about 1s 6d for a 7 lb. tin. The lime should be stored in an air-tight container, and should be used fresh. Any carry-over should not be used the following season.

The strength at which to apply Bordeaux mixture in control of most diseases during the growing season is 3:4:50—that is, 3 lb. of copper sulphate (bluestone), 4 lb. of hydrated lime, and 50 gallons of water. Proportionate amounts of these ingredients are required when smaller amounts of the mixture are being prepared. Where 4 gallons of spray are to be made, 4 oz. of copper sulphate and 5 oz. of hydrated lime are required. The amounts of the ingredients should be carefully weighed.

The following procedure should be followed when preparing 4 gallons of 3:4:50 Bordeaux:—

(1) Dissolve the copper sulphate in 2 gallons of water in a wooden, earthenware, copper, or glass vessel. Hot water may be used.

(2) Add water to the lime, and stir until it assumes the consistency of paste. Then dilute it with 2 gallons of water.

(3) Mix the two solutions, stirring vigorously while doing so.

The spray is then ready for use. It should be used immediately, as it loses in effectiveness if kept for any time. When the crop requires a further spraying a fresh mixture should be made.