

leaves. On the Sturmer variety, in the Braeburn area, Nelson, both dolomite and magnesium sulphate are now giving considerable improvement in condition of foliage, although in other localities soil dressings of magnesium have not been entirely satisfactory. Standard rates of application are 6 lb. dolomite per tree and 7 lb. Epsom salt per tree, but double these rates have proved more effective.

In analytical studies it has been found that under magnesium-deficient conditions the concentration of magnesium is about twice as great in tip leaves as in basal leaves of the current season's growth on the leader, whereas when supplies are adequate the distribution is fairly regular along this growth. Tip wood has approximately 50 per cent. more magnesium than tip leaves, but other wood has rather less than adjacent leaves. Calcium is highest in the oldest leaves, while potassium tends to be highest in the tip leaves. Improvements have been made in the technique for rapid demonstration of magnesium and potash deficiency by ashing leaves and spraying the ash with appropriate indicator solutions.

(c) *Rootstock Trials*.—Routine recording work has been maintained in all these trials at the Plant Diseases Division, the Cawthron Institute, and the Appleby Research Orchard. At Auckland the Docherty variety has been planted on twelve different stocks, including four aphid-resistant Merton stocks, in the hope of finding one superior to Northern Spy stock in resistance to root trouble in heavy, wet soils. At the Cawthron orchard a French Crab seedling as a stock for the Statesman variety is now showing signs of giving a higher yield than Northern Spy stock.

(d) *Varietal Trials*.—The Plant Diseases Division is finding that the fifteen strains of Delicious and nine of Cox's Orange, classified in earlier years, are maintaining their distinctive characters and can be regarded as fixed types. Two Delicious and one Cox are of higher colour than the standard types, and seem to be equal to the standards in quality. The apple varieties in the plantation now number sixty; and this will be increased to one hundred in 1942.

(e) *Plant Protection and Therapeutant Testing*.—The Plant Diseases Division has continued studies on the nature and control of late-spot of Sturmer and has found that nearly 90 per cent. of the infections are due to *Neofabraea malicorticis*. Summer Bordeaux sprays of weak concentration have again caused damage on the Sturmer variety in Hawke's Bay and cannot be recommended in this district. Colloidal sulphur alone, however, has again given Sturmers of excellent quality without causing foliage injury. Unfortunately, this precludes the use of early summer-oil sprays. At Appleby, reduction in Bordeaux injury has resulted from increasing the proportion of lime in the mix. In both districts Bordeaux substitutes have continued to cause more fruit and foliage damage than normal Bordeaux spray, and in Hawke's Bay the substitutes have failed to control black-spot of apple or of pear. On Delicious at Appleby, Bordeaux sprays applied before Christmas have given excellent fruit without causing foliage injury, and in combination with summer oil have controlled red-mite. Summer oils applied fourteen days after sulphurs in January have caused foliage injury.

Certified spray materials have all maintained their standard, and thirty-one are included in the latest Certification List.

The Cawthron Institute has received a consignment of woolly-aphis parasites from the United States of America, and will be testing them under laboratory conditions during the coming spring.

QUINCE.

Brown-rot of quince on specimens from Hawke's Bay was examined at the Plant Diseases Division and proved to be *Sclerotinia fructicola*, the same organism that attacks stone-fruits in the Dominion.

STONE-FRUIT.

(a) *Peach*.—Studies of the varietal aspects of susceptibility to brown-rot and leaf-curl have been begun by the Plant Diseases Division on its earlier planted material. Brown-rot incidence has not been at all uniform among varieties, but this may be due as much to weather at time of ripening as to inherent varietal differences in susceptibility.

(b) *Plum*.—*Bacterium pruni*, bacterial-spot of plum, has been isolated from plum-trees in Hawke's Bay, and proved to be the cause of a somewhat serious shot-hole disease of peaches in Auckland.

CITRUS.

Rootstock Trials.—The Plant Diseases Division tests of rootstocks for lemon and sweet orange have now reached the stage at which a considerable number of trees will be planted on the permanent trial areas during the next few months. Marked variations in the growth of Washington Navel on the different stocks have already been noted.

MISCELLANEOUS.

(a) *Grapes*.—The Cawthron Institute has found that a chlorosis of the leaves and an internal browning of the fruit grown in the Braeburn area can be controlled by the combined use of boron and potash, preferably with the addition of nitrogen and phosphates.

(b) *Hybrid Berries*.—Of several types growing at the Plant Diseases Division in Auckland, only the Youngberry—a hybrid between Phenomenal Berry and Mayes Dewberry—has shown promise of meriting extended study.

(c) *Sub-tropical Fruits*.—The Peruvian melon (*Solanum muricatum*) and several varieties of Japanese persimmon are being tested by the Plant Diseases Division. Seed of a large-fruited guava from Egypt has germinated successfully.

(d) *Raspberry*.—The Cawthron Institute has given further attention to the control of raspberry bud-moth, and has further evidence that oil sprays against the eggs give effective control in the early part of the season.