

Iron and zinc deficiencies in citrus

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Left: leaves affected with iron deficiency showing fine network of green veins on pale background tissue. Right: zinc deficiency results in small, narrow leaves with conspicuous yellow mottle between lateral veins. Twig growth is short. Illustration: Margaret Senior.

IRON DEFICIENCY

Symptoms

The younger leaves are light green to pale yellow with a network of darker green veins. In general, leaf size is normal and the shoots are not shortened. In severe cases the leaves become very pale, even whitish, and the colour of the smaller veins fades until only a little green remains in the midrib. Dieback occurs, little or no fruit is carried and new growth is poor.

Trees suffer from iron deficiency in calcareous soils with high pH values. Under such conditions, iron required to form chlorophyll is unavailable to the plant.

Control

Irrigation must be carefully managed, as over-irrigating will make the condition worse. If only a few trees are affected, the application of an iron chelate to the soil under the trees may be worth a trial, but this treatment is uneconomic for a large block. Foliar sprays of either iron sulphate or iron chelate have usually proved ineffective.

Citrus stocks vary in their ability to utilise iron in alkaline soils. *Poncirus trifoliata*, which is more sensitive than sweet orange or rough lemon, should not be used. The Troyer citrange appears to have a tolerance to alkalinity similar to that of rough lemon. Cleopatra mandarin is the most tolerant of the available stocks and may be used for alkaline soils where drainage is not a problem.

ZINC DEFICIENCY

Symptoms

Zinc deficiency affects citrus growing in either acid or alkaline soils, but is usually more severe with alkaline soils. Excessive use of phosphate fertilisers can accentuate zinc deficiency.

Leaves of zinc-deficient citrus are small and abnormally narrow, and rather crowded, on short stems; this produces a bunched appearance. Areas between the main lateral veins are whitish yellow. This mottling, which first appears between the main veins, occurs in the young growth and persists as the leaf ages. Fruit tends to be small, rather elongated, pale and coarse. There is considerable dieback of the smaller twigs, with production of multiple buds and numerous small, weak shoots, so that the trees become bushy and stunted.

Mild early stages of zinc deficiency resemble those of manganese deficiency. At these stages leaf size and shape are normal and the mottled areas are pale green rather than the bright creamy yellow blotches seen in the illustration. Zinc and manganese deficiencies can

occur in combination and may be treated with a combination spray.

Control

Zinc deficiency is controlled by foliar sprays. Best results are obtained by spraying when the spring flush leaves are one-third to two-thirds developed. Spraying will need to be repeated annually, and in severe cases more than one spray per season may be required. One of the sprays should be timed to cover the partly developed spring growth. Poor correction will result from spraying when only old hardened leaves are on the tree.

Soil applications of zinc salts has not proved satisfactory for treating zinc deficiency.

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The information contained in this publication is based on knowledge and understanding at the time of review March 2003. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.