



## Mineral deficiencies in fruit trees

August 2003

AG0089

H. Schneider, Cobram and V. Bates, Knoxfield

ISSN 1329-8062

### Introduction

Fruit trees which are not growing well or which are producing abnormal leaves may be suffering from a deficiency or an excess of a mineral element. Often systems are complicated by more than one nutrient deficiency.

A major influence on nutrient balance in fruit trees is pH. The optimum pH for deciduous pome and stone fruit orchards is 6.5 to 7 (measured in 5:1 water) or 6 to 6.5 (measured in calcium chloride).

This Agriculture Note will assist you in identifying likely deficiencies (or toxicities) in fruit trees and to treat them. However it's important to assess trees with a leaf analysis to identify more precisely actual nutritional problems.

### Symptoms

#### **Nitrogen deficiency**

The main symptoms of nitrogen deficiency are: yellow leaves at the base of the current seasons growth. The newer leaves are often greener, taking nitrogen from the base leaves on the new shoots. Leaves are often smaller and on shorter internodes. Overall tree vigour is poor.

Fruit is usually small and often highly coloured. Leaves turn to autumn colours and fall off early.

#### **Phosphorus deficiency**

Phosphorus deficiency is mainly seen on young trees.

Leaves are small but dark green and they develop autumn tints early, particularly deep reds.

The older leaves of peach trees develop purple spots on margins which roll upwards. Flowering is often sparse.

#### **Potassium deficiency**

The older leaves at the base of the new growth develop a dark brown edges and these leaves may roll inwards. This is seen mainly on apples but also occurs on stone fruit, particularly on sandier soil types. Potassium deficiency is aggravated by the use of excessive nitrogen fertilisers.

#### **Chloride toxicity**

The older leaves on new shoots and also leaves on spurs develop a red-brown marginal scorch. The growing tips remain green but are usually smaller and a lighter green. Leaves drop early, fruit is smaller and may have a salty taste.

Chloride toxicity can be caused by excess salinity in the soil or in irrigation water or by salt-laden sea winds.

Marginal leaf scorch can also be caused by using saline bore water for spraying.

Other sources of salinity symptoms could come from using poor quality gypsum or sometimes lime that may contain excessive salt.

#### **Magnesium deficiency**

Old leaves and spur leaves surrounding the fruit turn yellow at leaf tips in mid-summer and then fall from the tree. The top of older, basal leaves may become yellow leaving a green arrow shape at the base of the leaf. These symptoms are seen mainly in apples and lemons.

Magnesium deficiency occurs where too much potassium and not enough nitrogen is used, or where soil pH is too low. Magnesium deficiency is usually associated with sandier soils.

#### **Manganese deficiency**

Manganese toxicity is not common on loam and clay loam soil. It is more common on light alkaline soils. In north western Victoria. Symptoms occur on older leaves which turn pale green except for veins.

#### **Zinc deficiency**

Zinc deficiency is more common on alkaline, sandy soils in North Western Victoria.

Typical zinc deficiency shows up as small leaves clustered together on short stem internodes. Leaves have bright yellow blotches with the main vein remaining green.

#### **Iron deficiency**

Iron deficiency shows up as the yellow leaves with veins prominently dark green. Iron deficiency occurs mainly on lemons but also on other fruit trees where soil is rich in lime or highly alkaline.

#### **Bark measles**

Growth is poor and the bark of older wood is rough (apple trees only). Fruit spurs may die. Dark brown spots are seen in the green part of the bark (phloem) if surface bark of older wood is scraped away. It is mainly in the variety Delicious. Bark measles is sometimes caused by too much manganese but is more often caused by acid soils or root troubles due to waterlogging.

**Copper deficiency**

Growing tips of young shoots of apple and pear trees die back and blacken and bend over. The bark of pears may become rough. Copper deficiency occurs mainly on sandy soils, often when too much nitrogen and phosphate fertilisers are used.

**Treatment**

**Note: Fertiliser rates are for trees 3 years and older.**

**Nitrogen deficiency**

Apply a fertiliser containing nitrogen such as ammonium nitrate (2 to 3 kg per tree) or well rotted animal manure (poultry manure 20 to 30 kg per tree) and eliminate grasses and other weeds for a distance of at least 500 mm around the tree trunk. Apply half to two-thirds of the fertiliser in autumn and the rest in spring. Use half these rates in later years for apples and pears.

**Potassium deficiency**

Apply a fertiliser containing potassium, such as muriate of potash (1 to 2 kg per tree) or a mixed N:P:K fertiliser (4 to 8 kg per tree depending on the potassium (K) content). Halve these rates after the first year.

**Chloride toxicity**

Do not use water containing more than 600 ppm total soluble solids for spraying trees or water containing more than 1000 ppm total soluble solids for irrigating. Flush soil out with salt-free water if possible.

**Phosphorus deficiency**

Dig in 10 kg of superphosphate (20 kg for trees six years and older) around the tree. Do not repeat this. Use three to five leaf sprays of 0.5% (5 g per litre) of monosodium phosphate, plus a wetting agent.

**Magnesium deficiency**

Do not apply any potassium fertiliser. Increase the amount of nitrogen fertiliser. Apply magnesium carbonate or a lime containing magnesium to tree. Spray leaves two or three times with 1% (10g per litre) magnesium nitrate or 2% magnesium sulphate, plus a wetting agent.

**Manganese deficiency**

Apply two or three foliar sprays containing 0.25% (2.5 g per litre) of manganese sulphate, plus a wetting agent.

**Zinc deficiency**

Apply two or three sprays of 0.2% (2 g per litre) zinc sulphate with a wetting agent, or two or three sprays of a fungicide containing zinc during the growing season. (Note: Fungicides containing zinc may cause leaf fall from early varieties of plums).

**Iron deficiency**

Apply two or three sprays of chelated iron at 0.1% (1 g/litre) to the foliage of affected trees. Chelated iron may be applied in water to the soil around trees growing on acid soils.

**Bark measles**

Improve soil drainage. Liming may help if the soil is very acid (below pH 5.0).

**Copper deficiency**

Apply 200 to 500 g of copper sulphate per tree (less for trees one to two years old) and apply leaf sprays of copper hydroxide at a concentration of 0.2% (2 g per litre). Leaf sprays may cause russetting of fruit.

The advice provided in this publication is intended as a source of information only. Always read the label before using any of the products mentioned. The State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.