



## FERTILIZER GUIDE

# FACT SHEET

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Fact Sheet No. 121  
Revised 11/2013

### 1. TEMPERATURE

The best foliar uptake is at 65 - 85 Deg F.

### 2. TIME

Apply when the tree is not under moisture stress - night time or early morning

### 3. SURFACTANTS

Foliar elements on the leaf must form a film to go through the waxy cuticle and then epidermis. The longer the element is on the leaf the better the uptake. Therefore spreaders, penetrants and stickers will help. Once taken up the elements will go directly to the phloem - calcium the exception.

### 4. NUMBER OF APPLICATIONS

Surfactants reduce the total amount of element that adheres to the fruit skin (calcium sprays) due to the surfactant concentration in the spray; less element uptake may occur. Therefore a program with more calcium sprays is more beneficial than higher calcium concentrations through fewer sprays when using surfactants.

### 5. DROPLET SIZE

Lenticels and microscopic surface cracks are the most efficient pathway for calcium to follow into apples. Smaller droplet sprays are more effective.

### 6. WATER AND SPRAY pH

A spray water pH of 4 - 6 is most efficient and not phytotoxic to the plant.

### 7. SEASONAL TIMING

#### Soil Analysis

Soil applications for deficiencies of phosphorus, calcium, magnesium, boron, and zinc should be made before planting because of the poor mobility of these element in the soil. In established orchards periodic ground sprays of boron can maintain sufficient levels.

#### Previous Season Leaf and Fruit Analysis

Magnesium applications can begin pre-bloom if a predicted deficiency is expected. Dormant sprays of phosphorus and zinc can be made for the most efficient uptake of these elements in established orchards.

#### Within Season Leaf and Fruit Analysis

Maintenance of sufficient levels of all major, minor and micro nutrients can be addressed through within season leaf and fruit analysis. This can be done with split season applications of solid fertilizer and foliar sprays.

#### Environmental Factors

Hot dry weather usually causes poor uptake of phosphorus, potassium, calcium and boron.

#### Critical and Stress Periods Within the Tree

Applications at critical times to affect bud formation, fruiting, maturity and colouring can be made with nitrogen, phosphorus, potassium, calcium, magnesium, boron, zinc and molybdenum foliar sprays. Physiological stresses within the tree can be addressed before bloom and flower bud initiation.

#### Time of Best Uptake

You can determine the need and timing of foliar sprays and ground applications. Sprays can be made to maximize uptake. Movement of calcium into apple fruits occurs to a large extent in the cell division stage in the first four to five weeks after bloom (petal fall or calyx). Just prior to harvest there is often another increase in calcium movement to the fruit. See graph enclosed.

## 8. CHELATES

Initially designed for soil application chelates do not provide nutrients in the form most suitable for absorption and utilization by the leaf. For every pound of nutrient they supply, they furnish many times that much chelating agent.

## 9. NUTRIENT ELEMENT CONSIDERATIONS

### Certain Elements Aid in the Uptake and Translocation of Other Elements

Boron has been shown to increase calcium transport from leaf to leaf to fruit to some degree. Boron is also important in the uptake and utilization of P and K. Therefore if your leaf analysis shows boron levels below 25 ppm apply calcium with a small % boron. Nitrogen aids in the absorption of most elements.

### Elements Can Compete with Each Other

Elements such as calcium and magnesium with like ionic charge compete with each other. When correcting a deficiency of one also consider application of the other to maintain sufficient levels.

### Consider Calcium an Important Element

Calcium sprays increase fruit calcium, reduce the incidence of bitter pit and frequently improve apple fruit quality such as overall finish, red colour, scald control and fruit firmness when calcium is applied in conjunction with adequate levels of phosphorus, potassium and boron. Low soil moisture levels inhibit calcium uptake by the roots.

Ammonium ions, if present in the root zone, decrease the uptake of calcium and later interfere with its transport within the plant. Calcium in the presence of ammonium is preferentially transported to the leaves instead of the fruit. Therefore calcium nitrate is preferred over ammonium nitrate where calcium levels are a problem.

Shoots compete preferentially for calcium with the fruit, therefore anything that increases shoot growth such as high nitrogen applications or severe pruning will decrease calcium in the fruit.

## 10. MOST IMPORTANTLY FEED THE SOIL

Correct deficiencies before planting since some elements are difficult to incorporate into the root zone. Therefore understand which elements are more efficiently supplied through foliar sprays in established orchards. Use foliar feeding as a cultural practice during environmental stresses and also physiological stresses within the plant.