

### Yara Africa Fertilizer (Pty) Ltd

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## Knowledge grows



Operations in  
more than  
**50**  
countries



Sales to  
more than  
**150**  
countries

Yara's market presence includes a global network of sales offices in more than 50 countries and sale to more than 150. The company has a strong production and marketing base in Europe and has greatly extended its presence in North and South America, not least taking a strong position in Brazil, as well as in Australia, while expanding in Africa and Asia.

### Market Knowledge

Yara delivers a wide range of solutions for the world's farmers and industrial users, leveraging its experience and knowledge to tailor solutions to local needs. With regard to Agricultural Solutions, Yara offers the market's most complete portfolio of mineral fertilizers and solutions for sustainable agriculture – covering all necessary nutrients for most crops.



### Creating Impact

Yara commits to a sustainable future. Creating impact is our blueprint to create business value in the way we respond to human challenges. Yara creates value by delivering profitable, sustainable growth benefitting customers and shareholders – as well as society at large. By creating value Yara is positioned to create impact, to make a difference. Successful alignment of the company's current and future core business with global challenges will strengthen the company's position and develop a sustainable competitive edge. Yara creates impact by engaging in three focal areas where it is able to make a profound contribution: food security, resource management, and environmental issues. The three areas are intrinsically linked, and Yara is uniquely positioned to develop viable business solutions that address related global challenges.



# Quality Pome Fruit

# Timing is everything



Yara works closely with researchers and farmers all over the world gaining in valuable experience on how best to use our fertilizers.

The nutrients that are present in the soil are not always plant available, so the relationship between the nutrient content in the soil and crop yield is not always strong. Mineral fertilizers are to provide plant nutrients, not to feed the soil.

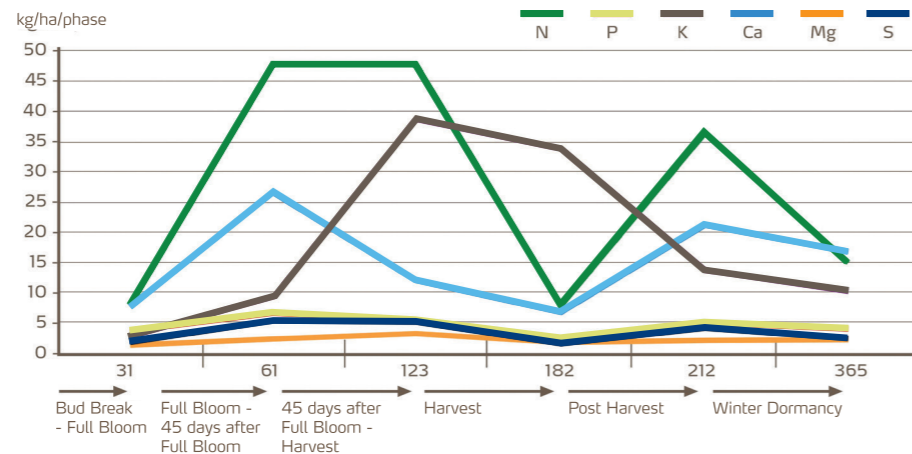
While soil background levels should be taken into account, the crop demand and crop physiology shall determine the plant nutrition strategy.

The nutritional status of the crop determines the fertilizer application rate and the timing, so the nutrients are applied only when and as needed.

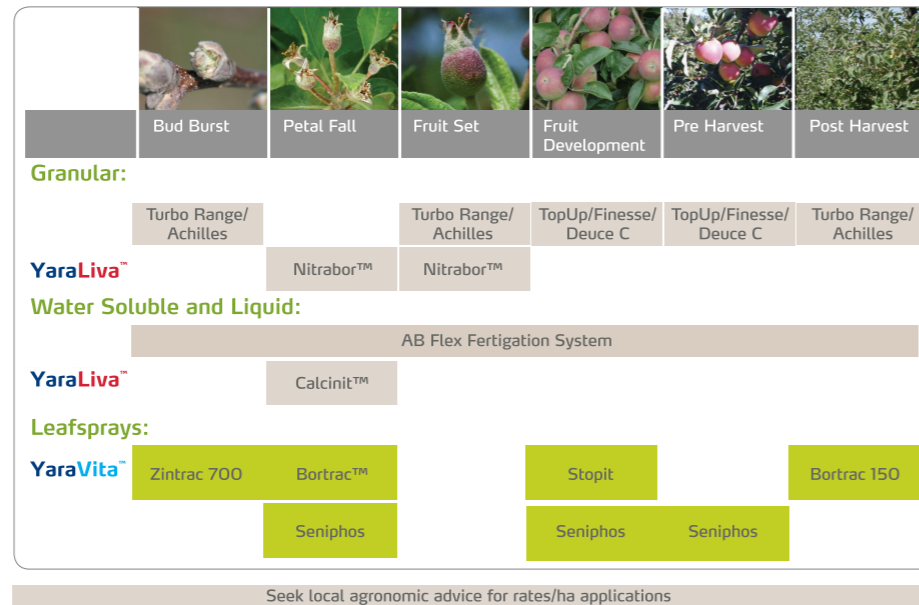
By meeting the needs of the crop, Yara's product portfolio and application competence are ideally suited to this "just-in time" approach.

YaraVita™ products are not simply nutrients. They are finished products designed from the start with crop nutrition in mind. When you choose YaraVita, you can be sure that what you apply will be easy and convenient to use and effective and safe for the crop.

## Nutrient Application Timing Chart for Pome Fruit



## Fertilizer Programme for Apples



## Important Nutrients

### Nitrogen

Nitrogen has a major effect on yield and quality. It is a component of the chlorophyll molecule and involved in nucleic acid synthesis and hence important for cell division. Nitrogen is involved in amino acid synthesis and protein production. Its role in ATP synthesis provides energy to drive a host of other growth processes in the tree.

### Phosphorus

Phosphorus is involved in energy transfer, the maintenance of cell membranes and as a bridging element for genetic information. Phosphorus has a direct effect on yield and tree health, but it is also important in determining fruit size, firmness, colour and storage potential.

### Potassium

Potassium promotes strong, vigorous tree growth, boosts fruit size and cell

strength. It also encourages good tolerance to pests and diseases and improves sweetness and colour of fruit.

### Calcium

Calcium activates enzymes and is essential for cell division, elongation, and fruit growth. It stabilizes and ensures permeability of the cell wall, protecting it from degradation by enzymes.

### Magnesium

Magnesium is a key constituent of the chlorophyll molecule; It is also involved in various biochemical functions including activating enzymes involving phosphorylation, and protein synthesis.

### Sulphur

Sulphur is a key component of amino acids, proteins and enzymes.

### Boron

Boron is involved in cell wall formation, stabilization, lignification and

xylem differentiation. In pome fruit it is responsible for pollen germination and pollen tube formation and activation

### Copper

Copper is required for chlorophyll synthesis and is a constituent of enzymes responsible for the reduction of molecular oxygen.

### Iron

Iron is required as a precursor to chlorophyll formation and in a number of important plant enzymes.

### Manganese

Manganese is involved in a wide range of enzyme processes.

### Zinc

Zinc functions in many enzyme systems and biochemical functions.

## Calcium and Quality

Large amounts of calcium are needed within the tree to support healthy growth (Figure 1). While only a small proportion of all calcium ends up in the fruit, this low concentration is critical and it is important to minimize storage quality problems.

% Apples with Bitter Pit

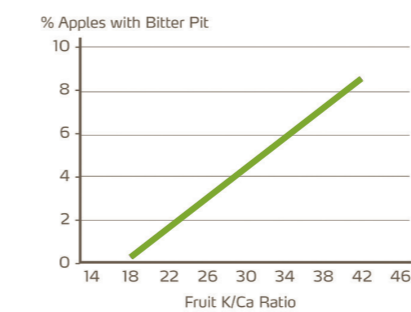


Figure 1

Fruit applications are usually needed to supplement soil-supplied calcium.

Calcium is taken up by root tips and transported to the leaves and developing fruitlets through the transpiration stream, via the xylem. At this stage, uptake is quite rapid and soil supplies are important.

Trees with a heavy load will have more disorder problems, because the high

numbers of fruits compete for the available calcium. Equally, those with a low fruit load could suffer from calcium dilution problems because fruit size is large. Thus, a correct balance between crop load and fruit size is important.

Soil application of calcium nitrate in the spring increases crop yield and at the same time supplies calcium to the fruitlet. Lack of calcium nutrition increases the incidence of bitter pit and internal breakdown. Often, this is associated with an imbalance between the potassium and calcium availability (Figure 1).

Soil supply is important, but this should be backed by fruit applied sprays

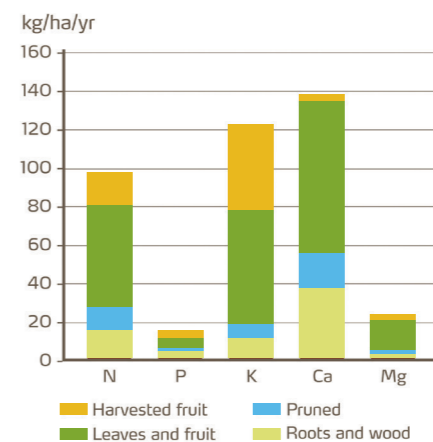


Figure 2

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