

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
Table Grapes**

Timing is everything

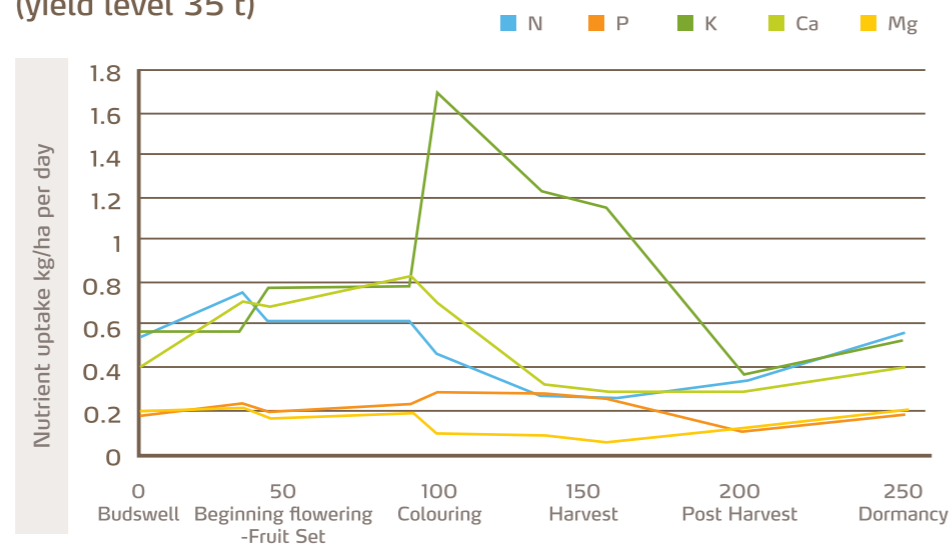


Yara works closely with researchers and farmers all over the world gaining in valuable experience on how best to use our fertilizers. The nutrients that are present in the soil are not always plant available, so the relationship between the nutrient content in the soil and crop yield is not always strong. 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.

Major Nutrient uptake, Table Grape, South Africa (yield level 35 t)

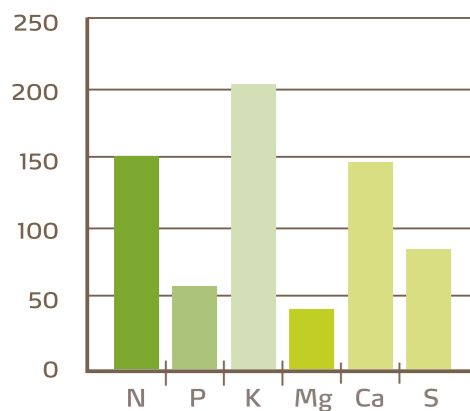


Fertilizer Programmes for Table grapes:

Seek local agronomic advice for rates/ha

	Bud Burst	Shoot Growth	Flowering	Fruit Set	Veraison	Post Harvest
Granular						
YaraLiva™	Nitrabor/Turbo range	Nitrabor/Turbo range	Nitrabor	Finesse		Turbo range
Other						
Water soluble:						
Other	AB Flex water soluble range.					
YaraLiva™		Calcinit™	Calcinit™			
Liquid:						
Other	AB Flex fertigation system.					
Leafsprays:						
YaraVita™		Bortrac 150	Zintrac 700	Seniphos	Stopit	
			Mantrac Pro	Mantrac Pro		

Yearly nutrient uptake (kg/ha)



Important Nutrients

Nitrogen

Nitrogen is needed at high levels during phases of rapid growth. However, too much nitrogen can encourage excessive growth and vigor, and can result in shading and reduced fruit quality at later stages of growth. Nitrogen also needs to be available within the plant at the beginning of ripening for maximum accumulation in the grapes. Nitrogen is used during berry development, and applied just prior to leaf senescence to provide reserves in the vine to boost early season growth in the following season.

Phosphorus

Phosphorus is a key nutrient for the supply of "energy" to the plant and also to ensure good root and vine development.

Potassium

Potassium is generally needed in greater quantities than nitrogen – removal in the fruit of a relatively high yielding crop can be nearly 3.1 kg per ton of grapes. South African experience is that K-uptake can be over 200kg/ha, significantly more than that for nitrogen (Figure 1). However, care is needed as excessive use of potassium can lower magnesium and/or calcium availability. Greatest potassium need is during fruit development and maturation (Figure 4), with the potassium important for carbohydrate synthesis.

Magnesium

Magnesium deficiency can lead to premature fruit drop at harvest and while foliar sprays can correct in-season deficiencies - particularly as a result of a poor K:Mg balance - soil applied Mg is the best long term strategy to

ensure this element is not limiting. Peak magnesium uptake is during shoot development and at the beginning of berry development.

Boron

Boron deficiencies can seriously affect table grape production, by causing poor berry set, with large and small berries in the bunch (Hen and Chickens).

Zinc

Zinc deficiencies can be a serious problem causing poor fruit set and stunted shoots with small, misshapen leaves. Foliar application or fertigation helps minimize in-season micronutrient deficiencies by quickly correcting the problem.

External Quality

Table grapes must have good eating quality and be attractive in appearance. Berries need to retain their good quality during shipping and should be pest, dust and disease free. In addition, they need to be well formed, normally developed, and intact. Minimum bunch weights and the strength of attachment between the berry and the stalk are also important.

Most consumers seek a large, evenly sized bunches/berries with consistent appearance. Color is important, with green, red and black colored grapes being favored over those of more intermediate colors.

Eating quality is affected by taste, aroma, skin and pulp texture, and the presence or absence of seeds. A good 'sufficiently firm' crunch is desirable.

Quality

Physical or chemical crop manipulation is important to ensure even berry size and consistent maturity to meet market specifications. Use fungicides and insecticides as necessary and maintain an optimum irrigation regime throughout fruit fill to maintain skin and pulp qualities, thus reducing splitting of berries. Maintaining high sugars and a juicy berry by manipulating the time of maturity is also important to marketability.

The importance of Calcium

Calcium is a key component of cell walls maintaining the membrane structure and also having a direct influence on the regulation of enzyme systems, phytohormone activities and nutrient uptake. It has a key specific influence on post-harvest berry quality. Calcium is required by grapes in large amounts. In total about 150kg/ha of calcium is taken up by table grapes every year (Figure1). It is required for strong root development, especially pre-flowering, but is mainly found in leaves where it supports strong vigorous growth.

Nearly 40% of calcium absorption takes place between leaf emergence and fruit set. After fruit-set and before veraison, another 30% is taken up and accumulated mainly in the leaves and bunches. The last 30% is absorbed after veraison, mainly when the branches start to lignify. It is common practice to use applications through the season to build up levels in crop tissue and again at berry fill and maturity. This minimizes deterioration of berry quality during shipment and storage.

Ammonium based fertilizers can reduce calcium uptake into the plant by reducing soil pH and water uptake rate, and slowing transpiration. This is not the case with calcium nitrate formulations, which can be used to maximize calcium

uptake into the vine. The concentration of calcium within the berries decreases during ripening. This is because the majority of the calcium is located in the skin of the grape. It is very important to maintain the level of calcium by using applications to the vine throughout the season and/or sprays targeted at the fruit. Such a program boosts skin quality as well as minimizing end of season cracking and splitting under wet conditions. The program also improves post-harvest berry weight.

Loss in berry weight (%)

