



Landmark team sharpens hydroponic nutrition skills

The Landmark group “tune-in” during a tour of the blueberry enterprise on the Costa Group property near Guyra, NSW.

HAIFA Australia recently hosted a strong contingent from the Landmark horticulture team across the country in Coffs Harbour, New South Wales, to help hone their skills with fertiliser programs for hydroponic growing systems.

The two-day event focused on understanding and calculating balanced fertiliser solutions for hydroponic crops.

Haifa Australia Managing Director Trevor

Dennis said it was important fertiliser mixtures were chemically balanced to ensure nutrients were absorbed by plants properly.

“The aim is for nutrients to be readily absorbed and not to drop out of solutions or antagonise each other,” Trevor said.

“We need to ensure that all of the parameters that support plant growth

are optimised – factors like pH, nutrient types used and the nutrient loading within the solution, which also then needs to fit with the local water characteristics and quality.

“The re-use of solutions in different hydroponic systems is also important to understand, particularly so we are not loading the solutions with negative salts.”

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A highlight of the event was a visit to the Costa Group's state-of-the-art tomato glasshouse facility and hydroponic technology at Guyra, as well as its Nutrigation™ of blueberry and raspberry field crops.

Haifa fertiliser products are low in sodium, a salt which impacts growth.

The event also included a visit to the Costa Group's state-of-the-art tomato glasshouse facility and hydroponic technology at Guyra, as well as its Nutrigation™ of blueberry and raspberry field crops.

Highlight

"This was a highlight of the event, taking the 'classroom' understanding and applying it in a commercial situation," Trevor said.

Ron Bollard with Landmark at Yandina, north of Nambour in Queensland, said the training event would help to accurately create fertiliser programs for hydroponic crops.

"It highlighted the importance of monitoring nutrient solutions – both what is being taken up and what is coming out of plants," Ron said.

"It has given us tools to be able to monitor solutions with clients, instead of just putting fertilisers into A and B tanks.

"It is good to be able to manually check things with EC and pH meters, especially since water can contain high salt content or dissolved salts."

He said the Costa Group's facility was

certainly a state-of-the-art, controlled atmosphere system, with carbon dioxide used to fast-track the growth of the tomatoes.

Linden Bignell, Branch Manager with Landmark at Darwin, said working through suitable fertiliser solutions was well worthwhile and would enable staff to pass on some tips to clients for their fertiliser programs.

"It will allow us to work more closely with them and to help troubleshoot certain situations with them. We will be able to look more closely at what they are doing and their mixes," Linden said.

He said most growers in the region were Vietnamese growers of mangoes and Asian vegetables, fed by fertigation systems.

Josh Lawlor, Branch Manager with Landmark at Guyra and who is closely involved with Costa Group's local facility, said the event was highly beneficial to help build knowledge on fertiliser programs for hydroponic crops.

He acknowledged that determining balanced fertiliser solutions for hydroponics involved a number of factors and said Haifa Agronomist Peter Anderson was well versed on the subject.

Tania McAnaney, National Horticulture Key Account Manager with Landmark,

said a wide range of staff attended the event, from branch managers to agronomists, and it was good to gain expert knowledge specifically in the area of hydroponic fertiliser solutions.

"We do a lot of training and development, but we have not focused on soluble fertilisers for a while and the Haifa agronomists were very good," Tania said.

"The visit to the Costa Group facility helped to validate what we learned in the classroom the previous day – we saw it in action.

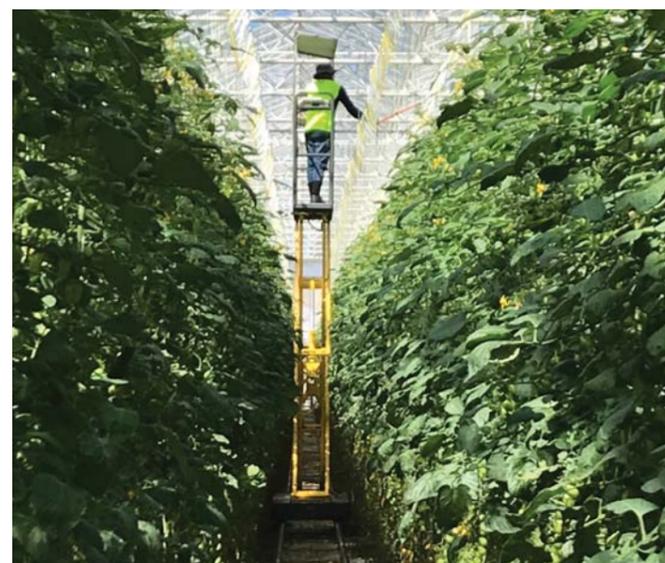
"To be able to speak with the head growers about it at Costa Group also provided great endorsement for Haifa and for Landmark."

TOP RIGHT: Landmark Darwin Branch Manager Linden Bignell inspects raspberry development on the Costa Group property near Guyra, NSW.

MIDDLE RIGHT: Pollinating tomato flowers at the Costa Group's tomato glasshouse facility near Guyra.

BOTTOM RIGHT: Rails for heating and running trolleys in the Costa Group's tomato glasshouse near Guyra.

BELOW: Haifa Agronomist Peter Anderson with members of the Landmark horticulture team during the two-day event in Coffs Harbour, NSW, focusing on fertiliser programs for hydroponic growing systems.



Haifa has strengthened its commitment toward the future with continued investment in production facilities, providing for increased capacity and improved fertiliser product quality.

New products, investments show strong commitment

By Trevor Dennis
Managing Director, Haifa Australia



HAIFA continues to strive to be a leader in soluble plant nutrition in Australia and is excited to be launching three new fertiliser products into the local market.

Growers and sales agents have long recognised that Haifa products are of the highest quality, ensuring they are easy to use and the nutrients are available to plants.

The company is also leading the world in reducing sodium in fertilisers and its three new products, Haifa Multi-K™ Reci, Haifa UP™ (urea phosphate) and Haifa Urea LB™ (low biuret), are all low in sodium.

In conjunction with Haifa Cal™ Prime, the new Multi-K Reci potassium nitrate fertiliser will help to reduce the impact of salt on plants as well as improve water use

efficiency, allowing growers to get more production from every drop of water.

Meanwhile, Haifa has strengthened its commitment toward the future with continued investment in production facilities, providing for increased capacity and improved fertiliser product quality.

Tens of millions of dollars will be invested in coming years, including in Australia with additional staff and greater facilities to increase its support to customers.

We are now looking forward to meeting with growers and industry at the Australian Banana Industry Congress this month and the Protected Cropping Australia Conference in July, both held on the Gold Coast – see you there!

Talk with Haifa at upcoming events

May 22-24: Australian Banana Industry Congress, Gold Coast

July 7-10: Protected Cropping Australia Conference, Gold Coast



Powerful online system plans custom fertilisation programs

HAIFA has launched a powerful online system to help growers, agronomists and advisers design customised fertilisation programs.

Offered free to users, the sophisticated Haifa NutriNet™ platform incorporates plant nutrition knowledge accumulated by Haifa over decades of field and research and development activities worldwide.

It integrates data regarding the crop, soil type, water analysis, irrigation system setup and other grower preferences. Together with comprehensive plant nutrition databases covering 80 common crops, the data is then compiled in order to generate a precise fertilisation program that meets the specific need of the crop under actual growth conditions.

Haifa NutriNet also incorporates a wealth of data characterising climatic conditions at a large variety of meteorological stations.

The software directs growers' workflow, supports decision-making and simplifies calculations. The majority of the process can be completed before each season, providing growers with a detailed work plan for the season ahead. The fertilisation programs also can be retrieved at any time for adjustments and to create "task reminders".

"We developed NutriNet in order to address practical considerations growers have in their daily operations," said Natan Feldman, Vice President of Marketing, Business Development and Innovation with Haifa.

"We are proud to provide the worlds' growers with such a sophisticated and powerful tool that can take them to the next level of plant nutrition. With NutriNet, they will be able to get the most from their crops and reap the benefits of their hard work."

Haifa CEO Motti Levin said the web-based tool was a significant extension of the company's 'Sharing Knowledge' values.

"As a global leader in the field, we are committed to supplying the best plant nutrition solutions together with a comprehensive knowledge base. We therefore invest heavily in knowledge services, as we do in production capacity and quality assurance," Motti said.

"Haifa is growing substantially, while keeping its pioneering spirit and

innovative approach."

Haifa Australia Managing Director Trevor Dennis said NutriNet would play a vital role in the decision-making between the fertiliser requirement and the water application for growers.

Trevor said it would improve operational and fertiliser use efficiencies, with the ability for growers to easily make quick adjustments to application rates as water applications change, while data also could be stored for later use.

Haifa NutriNet is ideally suited to laptop and desktop computers. It supports all common measuring unit systems and features a multilingual interface. The powerful online plant nutrition system can be found at www.nutrinet.haifa-group.com



Haifa in global sustainability drive for better future



HAIFA has joined the United Nations (UN) sustainability pathway.

The company is the first potassium nitrate manufacturer to join the UN Global Compact initiative and commit itself to following 17 Sustainable Development Goals (SDGs).

Global Compact is the world's most important initiative for responsible and sustainable corporate governance.

Haifa will follow guidelines on human rights and labour standards, as well as for protecting the environment.

SDGs aim to strategically anchor sustainability alongside corporate values, and implementation is expected to be an extended process. The Global Compact guides participants in following a path of continuous improvement.

"We are proud and excited to become a participant of this global movement of

sustainable companies, striving to create the world we want for us and for future generations," said Haifa CEO Motti Levin.

"As a multi-national corporate that develops the future of the world's agriculture, sustainability is in our DNA. Haifa offers cutting edge, sustainable and efficient plant nutrition solutions, while keeping sustainability as a prime value at our production facilities worldwide.

"We clearly see that since its foundation five decades ago, Haifa's vision and strategy are very much in-line with the current UN Global Compact. Therefore, joining this initiative was a natural step for us, emphasising our commitment for a sustainable future".

Haifa Australia Managing Director Trevor Dennis said as an international company with 14 global offices and a passion to help growers produce quality foods for a growing world population, Haifa was strongly committed to sustainability.

"Our products feed people and not only

are they designed to be more efficient and concentrated, thus also providing savings in transport and storage costs, but Haifa is leading the push for a more sustainable world supply chain," Trevor said.

He said with the increasingly discerning global market and various produce supply issues, Haifa's recognition from the UN and commitment to a raft of SDGs could also help its customers to gain access into important sensitive markets.

"It could help open up more opportunities for growers to premium paying export markets."

Earlier, Haifa Australia was one of the first specialty fertiliser suppliers to sign up to the Farm Waste Recovery (FWR) program in Australia for the collection and recycling of fertiliser packaging.

Trevor said the company was pleased to sign up to the stewardship program and recycling initiative to protect its brands and, importantly, the environment.



OUR FUTURE GENERATIONS IS EVERYONE'S BUSINESS

Haifa is the first potassium nitrate manufacturer to join the **UN Global Compact** initiative for a more sustainable future.

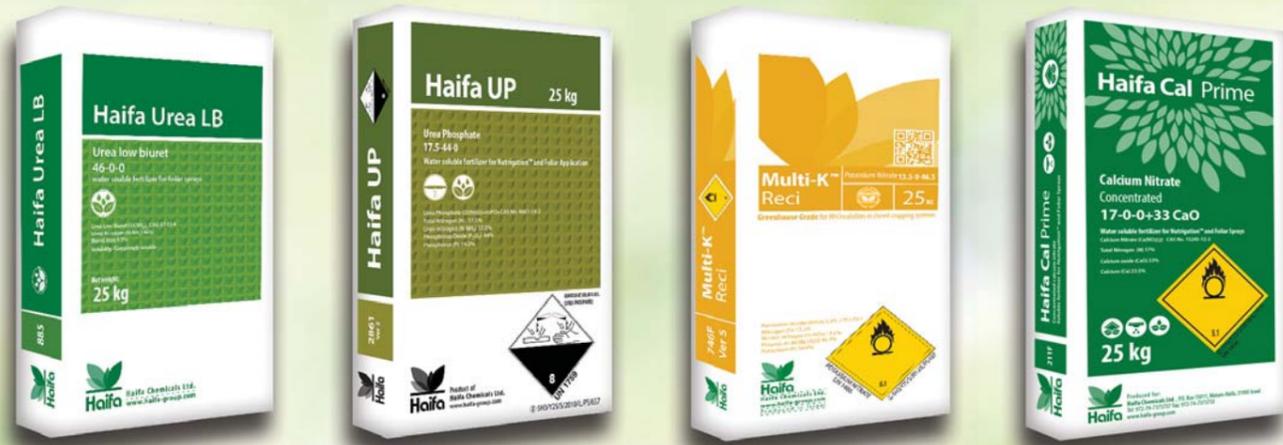
Is your fertiliser supplier following the 17 Sustainable Development Goals (SDG) under the UN? **Haifa is!**



We are proud and excited to become a participant of this global movement of sustainable companies, striving to create the world we want for us and for future generations.

HAIFA CEO MOTTI LEVIN

New low sodium fertilisers offer unique benefits



NEW fertiliser products launched by Haifa will offer some unique benefits to growers.

Haifa Australia Managing Director Trevor Dennis said growers were aware of 'biuret', an impurity that impacts product quality and growth, and the company's new Urea LB™ (low biuret) fertiliser would be welcomed by the citrus industry and for other tree crops where nitrogen, in conjunction with low impurities, was desired.

"Available from major retailers and supported by the Haifa team, Urea LB is a product of the highest quality and has been well received by the local market," Trevor said.

"Coming in a Haifa bag, growers know the quality and service will be to the highest level."

Haifa UP™ (urea phosphate), mainly suited to high pH soils, is another new addition to the company's range.

Trevor said urea phosphate was not widely used in Australia, however the company planned to demonstrate to growers and agronomists how it could have a unique fit in fertiliser programs.

"Haifa UP is a water soluble fertiliser supplying both nitrogen and

phosphorus, which once dissolved is highly acidic. It is the acidic nature of this product in solution that is its unique feature – the acid can have a cleaning effect on irrigation lines as well as a localised impact in the drip zone."

"It will appeal to those growers who are looking for the cleaning effect, as well as supplying nutrients."

Haifa Multi-K™ RecI, the new addition to the company's potassium nitrate range, has been introduced as a low sodium option for both greenhouse and open field application.

"In greenhouses, Multi-K RecI will be pivotal in reducing the sodium level of the nutrient solution, thus allowing it to be reused many times – not only saving money on fertiliser, but also helping to save water," Trevor said.

Coupled with other low salt Haifa products like Cal™ Prime, he said it demonstrated Haifa was leading the fight against negative salts.

Haifa Australia Agronomist Peter Anderson said the company had supplied these products in Europe for a number of years and it was now time for Australian

growers to be offered the benefits of low sodium fertiliser.

Multi-K RecI, together with Haifa Cal Prime, will take centre stage at the company's display at the Protected Cropping Australia Conference on the Gold Coast in July.

Haifa Cal Prime, with its high concentration and near zero ammonium, has set a new standard of calcium nitrate. Its high concentration means benefits for growers, allowing applications to be significantly reduced and savings to be made in labour and energy, as well as providing for less handling and transport.

Superior solubility also makes Haifa Cal Prime extra convenient to apply by Nutrigation™ or foliar spray.

Polyphosphates coming to Australia

By Peter Anderson, Haifa Australia Agronomist

HAIFA Australia plans to import Haifa polyphosphate products in the near future for Australian growers.

It is well understood that phosphorus is one of the major plant nutrients. It is involved in essential metabolic processes such as energy production in all parts of the plant, storing and transferring genetic information etc.

Plants absorb phosphates through their roots in the form of "orthophosphates".

Orthophosphates used as phosphate sources in nutrient solutions include mono-ammonium phosphate (MAP), potassium dihydrogen phosphate (MKP) and phosphoric acid. Locally, MAP or MKP are used as P sources in hydroponics.

There is a problem with these minerals – the preferred pH of our nutrient solutions, pH6-6.5, is the same pH range where phosphorous is less soluble (see graph). Hence, precipitation of phosphorus is common in the irrigation systems used for soilless crop production. The combination of phosphates with metals in the solution, such as calcium, can form very stable materials that are difficult to remove from the irrigation system.

Such precipitation can block pipes and emitters, leading to variation in the application of the irrigation water and, of course, the nutrients dissolved in it. This results in uneven crop growth. Blockages of irrigation systems, particularly drip emitters, are very common in greenhouses, as well as areas where "hard" water (water with calcium and magnesium salts – normally with high pH) is used for irrigation.

Polyphosphate

However, there is another form of phosphate, polyphosphate, that we can use to supply plant phosphorus.

Polyphosphates are molecules made from chains of joined phosphate groups and already exist within plant cells, the most well-known related to energy production (eg, ATP and ADP).

While plant roots cannot directly absorb polyphosphates, they do have the ability, through enzymatic reactions, to hydrolyse (cut) the polyphosphate into orthophosphates. Consequently, polyphosphates can be used as a P source in plant nutrient solutions.

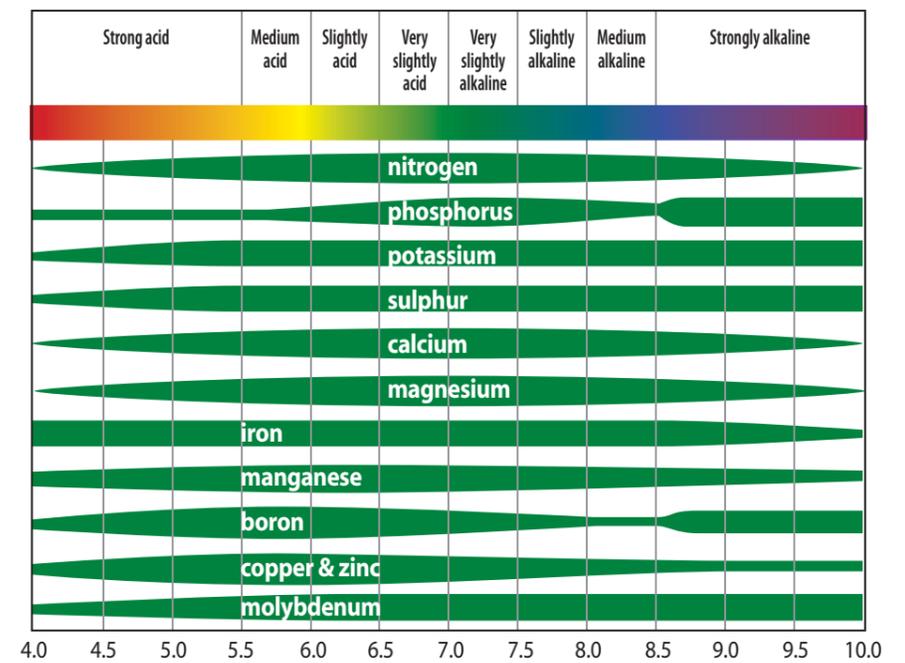
Furthermore, polyphosphates can react with metals such as calcium, bonding with them and carrying them in solution out of the irrigation system and the media into the root zone. Here, root enzymes "cut" the long chains into orthophosphates, liberating the metals for absorption by the plant roots.

The results of changing some of the phosphorus supply in hydroponics from orthophosphate to polyphosphate are quite beneficial, including:

- Availability of P regardless of pH – no mineral deposits.
- Removes existing deposits.
- More equal watering – more healthy plants.
- Improved root zone – more roots.
- More vegetative growth and better color.



Haifa Australia will soon have two products containing polyphosphate: **Haifa GrowClean™** and **Haifa VitaPhos-K™**.



The effect of soil pH on nutrient availability.

Haifa agronomists learn latest at world's greenhouse mecca

By Peter Anderson, Haifa Australia Agronomist

HAIFA agronomists across the globe working with greenhouse and soilless crops recently convened in Almeria, Spain, for a company greenhouse seminar.

Almeria, a city in the Andalusia region on the Spanish Mediterranean coast, has the world's largest concentration of greenhouses.

There are 36,000 hectares of plastic covered greenhouses in the area, growing mainly vegetables for export to Europe by sea. Most of the buildings are simple structures assembled originally from pine posts, cables, wire mesh and plastic. The newer models use steel beams for the uprights, but follow the same pattern. The greenhouses are 1-2ha in size.

Despite the simplicity of the buildings, they achieve spectacular results.

Crops are grown without heating and mainly in the soil, which is largely mulched using imported clay, coarse sand and manure.

Crops such as tomato, eggplant and capsicum are mostly grown in the blended soil using hydroponic principles. Normally three to four tanks are used for both soil and soilless cultivation. Only around 30 per cent of the total cropping area is grown in soilless media.

Water supplies for agriculture in the desert area are varied – there are two large pumping stations drawing from aquifers, a reservoir in the nearby, snow-covered mountain to the north, as well as urban water treatment for recycling in the city of Almeria.

Fertigation

Fertilisers need to be suitable for EU food production standards and are registered in the same way Australian authorities register pesticides. Traceability is important.

Haifa sales agents supply the company's straight fertilisers and Poly-Feed™ blends, but also supply a product range called Haifa Multifeed™. This is a pre-blended, crystalline product designed to suit hydroponic production systems with A and B tank calcium and phosphate blends. It can be purchased in different size bulk bags up to 1 tonne, or in 25-kilogram bags.

The bulk bags can be custom blended to suit the particular crop or water requirement.

Haifa Multifeed is competing directly with liquid blends, and, when costs are compared per unit of NPK, it is cheaper to purchase and transport than liquids.



An older Almeria-style greenhouse.

The aquifers from where groundwater is pumped are directly under the greenhouse concentrations.

The main direction of the research is prescriptive crop fertigation based on soil moisture, soil nutrient content and plant (sap) analysis. The aim is to deliver the exact plant water and nutrition requirements and avoid further pollution of the groundwater.

Simple tools such as tensiometer, soil solution extraction devices and direct soil sampling are used to measure soil nutrients on-site. By combining this data with sap analysis and yield data from the same crop, nutrition can be adjusted

to precisely supply the crop's nutrient requirements. The results of automatic fertigation compared with more traditional, manual fertigation settings also are investigated.

Other research areas include:

- The positive effects of the potassium to calcium ratio in nutrient solutions on fruit taste and quality, but also in increasing the incidence of blossom-end rot.
- Artificial crop lighting, shade netting, production of biodiesel from algae grown on sewerage, and greenhouse design.

Most growers dissolve the bags in their own fertigation sheds. One sales agent has an interesting Haifa Multifeed service that involves carting the bagged crystalline fertiliser to the client's greenhouse, where a tank and re-circulating pump mounted on a small truck is then used to dissolve and deliver the ready-to-use fertiliser.

R&D

Locally, the University of Almeria undertakes research into solar, agriculture and water management.

The agriculture faculty has a research station in the greenhouse area, Cajamar, funded by the Caja Rural Bank. One of the main areas of research is groundwater pollution caused by leached nitrates from the intensive cropping system.



Harvesting capsicums in Almeria, Spain.



Different Haifa Multifeed bags.

The word on chelates...

By Peter Anderson, Haifa Australia Agronomist

HAIFA Australia has long supplied the Poly-Feed™ line of soluble, blended fertilisers for soilless, foliar and open field applications.

In addition to N, P and K, these Poly-Feed blends contain so-called micro-elements which, although used by plants in small amounts, are nevertheless essential for plant survival.

Macro-elements are nitrogen, phosphorus and potassium. Secondary elements are calcium (Ca), sulphur (S) and magnesium (Mg). Micro-elements are iron (Fe), manganese (Mn), boron (B), zinc (Zn), copper (Cu) and molybdenum (Mo).

Only calcium is not normally available in Poly-Feed, although Haifa Australia has imported the acidic Poly-Feed™ pHast blend, which can contain calcium.

On the Poly-Feed label, the micro-element metals Fe, Mn, Zn and Cu are listed as EDTA chelates.

Function of chelates – what does this mean and why is it relevant?

Firstly, plants don't eat, they only drink, meaning all the nutrition supplied to plants as fertiliser must be, or become, dissolved in water. Such dissolved atoms are described as ions and have an electrical charge or "valency".

Fertiliser materials bonded with clays or organic matter in the soil, or precipitated as insoluble salts through reactions with other minerals, are not available as "plant food".

The word 'chelate' is derived from the Greek word chela, or the claw of a lobster, crab or scorpion.

Chelation is the chemical term describing the bonding of a charged metal ion, like Fe²⁺, with the chelating agent, normally an organic molecule, to make a single

entity, the metal-chelate.

EDTA is one type of chelate – it actually stands for 'Ethylenediamide tetraacetic acid' that is commonly used in agriculture, industry, food preservation and medicine. There are other chelates.

In this metal-chelate form, the normally-reactive metal ion is protected from bonding with clays and organic material in the soil or bonding with non-metal ions in the soil or nutrient solution such as phosphates and sulphates. This means the chelated micro-elements, such as Iron EDTA, are substantially more available to plants than dissolved salts of the same minerals, such as iron sulphate.

Stability of chelates

Different chelates vary in their pH stability. Fe-EDTA in hydroponic solutions is stable only up to pH 6.5. So, a nutrient solution with Fe-EDTA must be kept below pH 6.5 or Fe deficiencies could become apparent in the crop.

Similarly, Fe-EDTA chelate is not recommended for calcareous soil with pH

above 6.5, or for fertigation with "hard" irrigation water with pH above 6.5.

Under these conditions, a different chelating agent should be used for Fe, such as EDDHA or DTPA.

Stability is different for a given chelating agent depending on which metal ion is chelated, eg Zn-EDTA (zinc chelate) is stable up to pH 10.

EDTA – for Mn, Zn, Cu, stable up to pH 10.

EDTA – for Fe, only below pH 6.5.

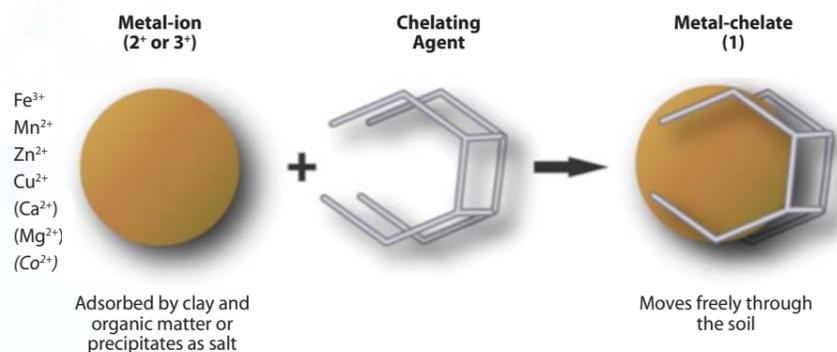
DTPA – for Fe, up to pH 7.5.

The use of chelated micro-elements is recommended in soluble fertilisers because the efficacy of these metal-chelates is highly superior to salts of the same metals.

Some care must be taken with respect to pH when mixing nutrient solutions, particularly with Fe-EDTA.

Irrigation water or soil with neutral to high pH could also be a problem with Fe-EDTA. Adding another iron chelate may be more effective.

Chelation = chemical change



Source: Akzo Nobel.

Haifa brings biotech expert to Banana Congress

At the upcoming Australian Banana Industry Congress on the Gold Coast, Haifa Australia is pleased to be introducing Israeli biotechnology specialist, Dr Eli Khayat, to talk with growers and industry.

Eli is the Scientific Director and Vice President of Research and Development at Rahan Meristem, a plant propagation, selection and breeding company located near the country's north-west border with Lebanon.

Rahan Meristem produces tens of millions of plants each year and is the world's leading exporter of tissue

cultured banana and plantain, including to more than 20 countries.

It takes superior clones of leading cultivated idio-types and evaluates them for increased yield and fruit quality in tropical and subtropical climates. This results in preferred selections of pest and disease-free banana cultivars and plants capable of increasing plantation profits.

Eli's presentation at Congress will focus on 'Advances in Banana Breeding and Genetics', including Panama disease and the genes that predispose plants to the disease.



Israeli biotechnology specialist, Dr Eli Khayat.

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PLANT NUTRITION EXPERT SYSTEM. POWERED BY HAIFA

- Enjoy a rich and updated database about the crops you grow
- Incorporates local climate data, soil analysis, irrigation water quality and more
- Design customised Nutrigation™ programs
- Work with the most accurate plant nutrition program
- Manage your fertilisation programs online

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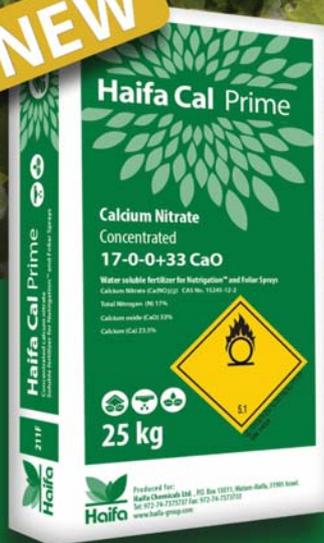
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Reduces applications, handling, transport



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