Haifa Africa

Quarterly Bulletin No.1 June 2006

WELCOME to the First edition of "**Haifa & Balton Newsletter**"

This month we will be covering:

- Blossom End Rot a rotten situation.
- MKP ideal P and K source.
- Plant nutrient relations and soilless cultivation basics.
- Hortec 2006 exhibition in Kenya.

Blossom End Rot a rotten situation

BER is a phenomenon resulting of an insufficient amount of calcium reaching the blossom (distal) end of the fruit to maintain cell integrity (*Ehret and Ho, 1986; Tachibana, 1991*). Calcium is essential to proper development of the membrane that binds the cells together into a cohesive unit. BER is the final expression of an unbalanced interaction between the rate of fruit growth and the internal distribution of calcium towards the susceptible tissue in the fruit (*Adams and Ho, 1992*).

Blossom end rot appears as round spots on the blossom end, opposite the stem end of the fruits. These sunken spots may appear as if they are water soaked, and will start out as brown spots, rapidly progressing to black. The spots will feel leathery to touch and may also develop moldy growths.

Blossom End Rot in peppers

Blossom End Rot in tomatoes

Blossom end rot is a physiological phenomenon controlled by several factors:

- **Ca concentration in the fruit** – affected by the water content, irrigation intervals, radiation and presence of other competing cations.
- **Fruit growth rate** – high growth rate will increase BER phenomena.
- **Environmental conditions** – low and high radiation as well as low humidity and high temperatures will increase the phenomena.
- **Fertilization** – high ammonium/nitrate ratio, high nitrogen concentration, high potassium concentration and high E.C will increase the phenomena.

In order to solve the above problem several steps should be taken in fertilization, irrigation, greenhouse climatic conditions, and agro-technique.

Fertilization – increase the Calcium concentration, decrease NH_4^+ ratio, decrease potassium concentration, maintain reasonable E.C, and apply foliar applications of calcium nitrate (although they are limited due to limited translocation).

Irrigation – avoid water logging or thirst, add night irrigation, increase irrigation intensity (6-12 irrigation a day).

Climate control – reduce radiation by shading nets or roof painting. The desired radiation should be between 900 to 1000 Micro-Einstein. Selecting the light intensity at which to start shading depends on the vigor of the plant (vegetative: generative balance) and how far into the production season the crop has progressed. Reduce temperature and increase humidity by fog or mist systems, “cooling mattress” that will decrease temperature.

Agro technique – Leaf picking – removal of the older leaves at the bottom of the plant canopy, as they are big sink for Ca_2^+. To minimize the potential risk of Botrytis infection, leaf picking should be conducted as morning tasks to allow the wounds to dry. Leaf picking ensures a better distribution of this Ca_2^+ between leaves and developing fruit and is normally continued depending on the climate and the variety.

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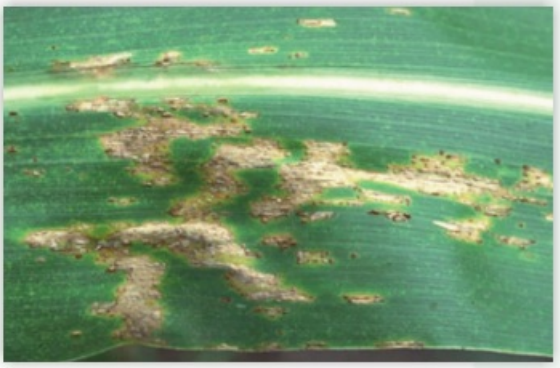
MKP ideal P and K source

Haifa's MKP is a fully water-soluble mono-potassium phosphate (0-52-34) fertilizer, a highly efficient source of phosphorus and potassium for plants. Due to its low EC value, MKP is most suitable for **Nutrigation** as a P and K source, and it can be tank-mixed with other fertilizers to meet crop nutritional needs (recommended for root establishment at the beginning of the growth season), throughout the growth cycle or when nitrogen needs to be restricted. Its low salt index, the absence of chloride, sodium and heavy metals, and its optimal buffered pH (4.5), makes Haifa MKP one of the best fertilizers for **foliar** application.



Common Rust in maize

MKP supports two major macro elements:
Phosphorus (P) is a major ingredient of many plant compounds (Nucleic acid, proteins, ATP). It stimulates the root development, early maturity and the fruit firmness.
Potassium (K) is a transporter of sugars, starch and acids. It also influences the photosynthetic reaction, respiration and the water uptake. It has a major influence on the fruit shape, color, taste and shelf life.

Haifa MKP can be used as part of IPM systems (Integrated Pest Management). It was proven by many trials that MKP has an influence on development of several diseases. Haifa MKP triggers an internal plant resistance effect by a mechanism recognized as "Induced Resistance". It can treat **Powdery Mildew**, a disease caused by several fungi (Oidium, Leveillula, Sphaerotheca, S. fuliginea, S. pannosa, Podosphaera, Unicinula necator) and **Common Rust** in maize (Puccinia sorghi). The application of MKP is either in tank-mix or alternation with conventional fungicides.

Recommendations for pest control

- Foliar application with 1% solution of MKP could prevent the development of Powdery Mildew in a variety of susceptible crops like: apples, peaches & nectarine, vineyards, mango, roses, melons and cucumbers.

Guidelines:

- Low infection pressure – tank mix at 1% + half dosage of the recommend pesticide.
- High infection pressure - tank mix at 1% + full dosage of the recommend pesticide.
- For common rust foliar application of 1.5%, solution of MKP at 5th-6th fully expended leaf.

Recommendations for nutritional aspect

- Foliar application of 1% - 2% whenever P or K is deficit and especially in intensive growth cycles.

Powdery Mildew in apples

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Plant nutrient relations

Plant roots absorb nutrients from the external solution to the cell's cytoplasm through some binding sites. Competition between ions can develop, especially for those with the same physical (electrical charge and ion diameter) and chemical properties (chemical balance). The relations can be **antagonistic** where one ion is influencing by decreasing the availability of another ion or **synergistic** where one ion is influencing by increasing the availability of another ion.

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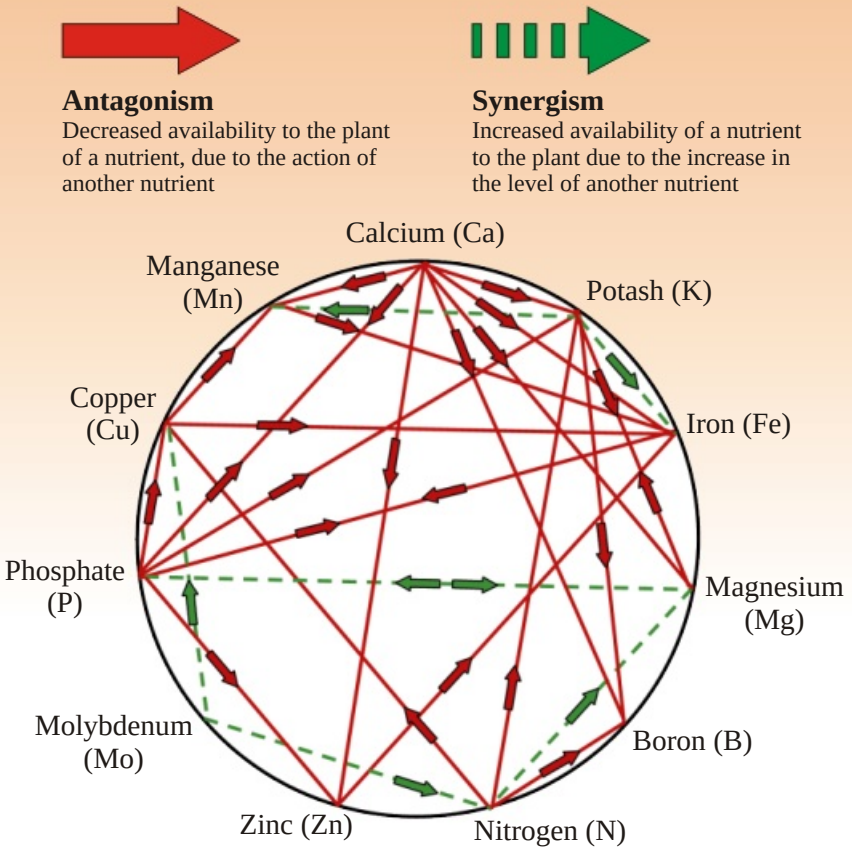
Plant nutrient relations

Antagonism

A high level of a particular nutrient in the soil can interfere with the availability and uptake by the plant of other nutrients. A few examples of antagonistic relations:

- Inhibition of K^+ and particularly Ca^{2+} and Mg^{2+} by NH_4^+ as compared with NO_3^- *(Shaviv et al., 1987)*.
- Effective competition of K^+ and Ca^{2+} with Mg^{2+} depressing its uptake rate *(Rufty et al. 1982)*.
- Mn^{2+} competes with Mg^{2+} by blocking binding sites for the magnesium *(Heenan & Campbell, 1981)*.
- Sulfate competes Molybdate and Selenium *(Pasricha et al., 1977), (Mikkelsen & Wwan, 1990)*.
- NO_3^- competes with Cl^- *(Glass & Siddiqi, 1985)*.

Mulder's Chart: Interaction between the various nutrients

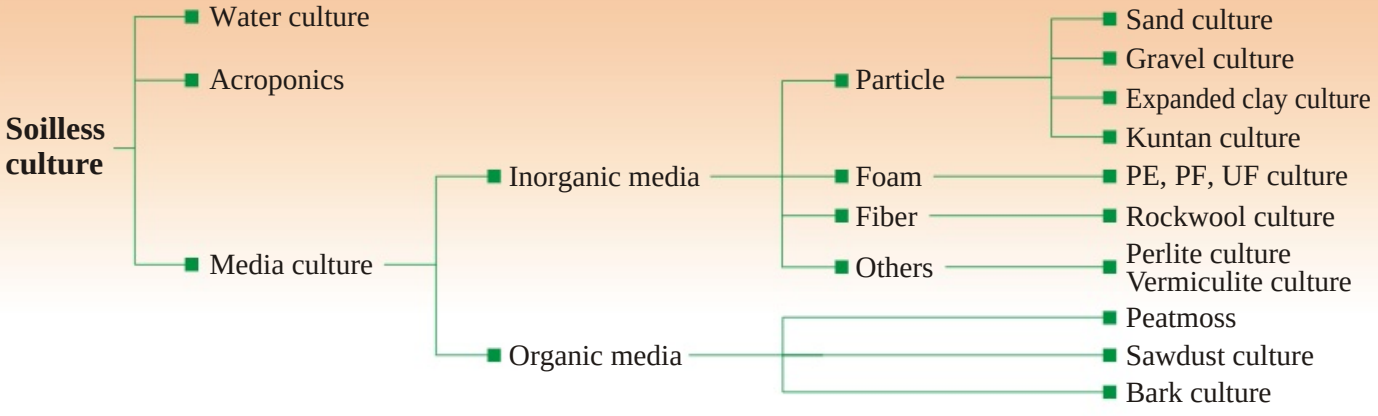


Synergism

Synergism is a feature of ion interaction during uptake. Stimulation of cation uptake by anions and vice versa is often observed and is mainly a reflection of the necessity of maintaining charge balance within the cells. Synergism in uptake can also be the result of an increase in metabolic activity of the roots when mineral nutrients are supplied after a period of deprivation.

Soilless cultivation basics

Different soilless cultivation methods



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Soilless culture, commonly referred to as "hydroponics" is a cultivation technique by which plants are grown in detachment from soil. The plants are cultivated in containers filled with several possible media. If these media are solid the method is called "soilless culture". If no medium is present and the plant roots are put in circulated nutrient solution the method is called "Hydroponics". If no medium is present and the plant roots get their nutrients by frequent spray of nutrient solution the method is called "Aeroponics".

For a proper control of the growing media, several factors should be inspected as follows:

- **E.C** - electrical conductivity as a general reflection of the electrolytes content in the solution. Level of "salts" in the solution influence the water availability and determine the irrigation volume.
- **Cl^-** - Chloride content as it is a highly soluble ion and less demanded affecting dramatically the salinization status of the water solution and influencing water availability. It will reflect whether the water volume supplied is sufficient or not.
- **pH** - solution balance between H^+ and OH^- ions influencing solubility and availability of several nutrients (mainly P and ME).
- **NO_3^-** - Nitrate as a major nitrogen form taken up by the plant will serve an overview on the plant nutrient consumption.
- **NO_2^-** - Nitrite is a middle form in the chemical transformation of ammonium to nitrate (Nitrification). A toxic molecule that appears mainly when the medium is over irrigated and the pH level is too alkali. This will assist on determination of irrigation intervals.

Hortec 2006 Exhibition (8th-10th March)

Hortec is an International agricultural exhibition, taking place once every two years in Kenya. Hortec 2006 was conducted at the KICC building in Nairobi and this year's exhibition theme was "Growing for the future".

Balton CP has invited its primary suppliers to take part in this important exhibition, **Haifa** and **Balton** took this opportunity to introduce the latest technologies in foliar application (Bonus npK) and controlled release fertilizers (CRF) to the professionals in the African market.

Both applications are considered to be very cost effective and highly efficient, hence suitable for big growers and also for the small scale growers.

As both companies are very much customer oriented – all the fertilizers are tailor-made as per specific costumer needs or crops specific nutritional demand in a certain area. The fact that the CRF technology enables growers to apply the fertilizer only once at the beginning of the crop cycle ("feed and forget") and the fact that the N-P-K ratio can be flexible and change during the growth cycle of the crop, proved to be of a major interest to farmers looking to optimize their resource allocations and yields.

This year **Haifa** and **Balton** will conduct trials in the CRF & Bonus npK technologies in order to further investigate, improve and expand the formulas needed for the African growers.

Haifa sales manager in Africa - Eyal Avigdori and Balton Agronomist - Oscar Shilliebo with a customer in the Haifa Chemicals booth at the Hortec.

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