Valagro®

Where science serves nature

FARM SOLUTION CATALOG

Ph. Marco Piscicelli / Italy

“To photograph: it is to put on the same line of sight the head, the eye and the heart”

(Henri Cartier-Bresson)

All the pictures with this symbol  have been photographed by Valagro employees.

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WHERE SCIENCE SERVES NATURE

A BROADER PERSPECTIVE

For years, Valagro has developed **innovative** and **effective solutions for plant nutrition and health** with passion, while respecting both people and the environment. The increasing demand for food and the well-being for the world's population requires an effective response. Trusting in a return to nature is not a realistic alternative because it is not sufficient to meet global needs. On the other hand, relying excessively on chemistry is not a sustainable choice for the environment in the long term.

VALAGRO believes it is possible to find a third way: to **meet the needs** of humankind using **fewer resources,** thanks to a new awareness, able to put Science at the service of man through innovation and respect for Nature.

Our challenge is to become a leading player in agricultural nutrition and biologicals - which includes bionutritionals and biocontrol - by integrating and delivering advanced products and value-added tech-based services to farmers globally.

Ph. Vittorio Bellocchio / Italy

The core challenge is to produce more with less. In the decades to come, the world's growers will need to cope with a harsher, less predictable climate and a growing scarcity of natural resources while meeting an ever increasing global demand for food.

Our vision is based on

Environmental Sustainability

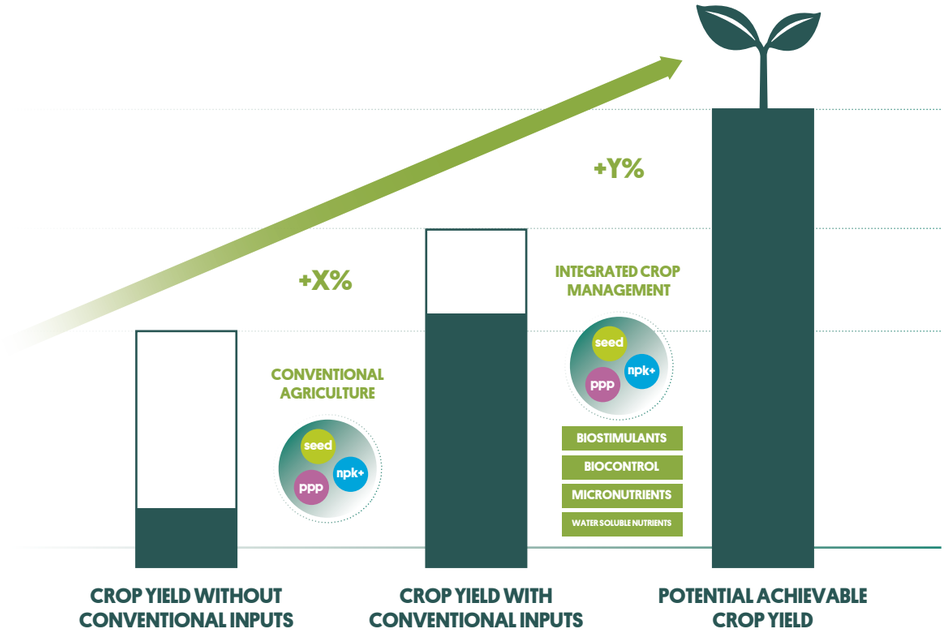
Ensure better harvests in terms of quality and quantity, using less soil, less water, and fewer technical means. To overcome the challenge of providing more food for the world's needs by reducing the impact on the environment.

Centrality of the Customer

Understand the needs of our customers to: help them get the most out of their crops; meet the demands and expectations of the market; and have a higher return on investment.

Scientific Innovation

Create an even-broader and diversified range of solutions that combine efficiency and efficacy, sustainability and productivity.



Valagro Global History

1980s

- **Valagro** was founded in Italy by **Ottorino La Rocca & Giuseppe Natale.**
- The first bionutritional product is launched.

1990s

- The first commercial subsidiary is established in **Spain.**
- New commercial subsidiaries are set up in **Greece, Mexico, Colombia and Brazil**.

2000

- Acquisition of **Algea in Norway and Maxicrop in England.**
- New commercial subsidiary established in the **U.S.**
- Acquisition of **Samabiol in France**.

2012

- Acquisition of **Pacific Growers** wholesale business lines.
- **GeaPower** is implemented to improve plant performance.

2014

- A site is purchased in **Brazil** for a new planned manufacturing facility.
- New commercial Subsidiary in **Turkey.**

2015

- Acquisition of the company **Sri Biotech Laboratories India.**

2016

- New commercial subsidiary in **China.**

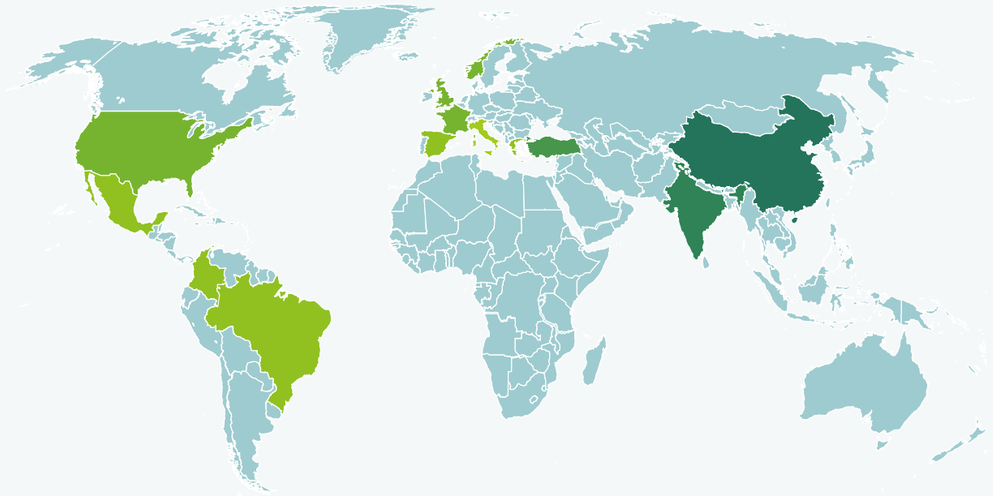
2017

- New production plant in **Brazil.**

2018

- Official launch of Valagro's project to build a new plant in the **United States**.

With about 40 years of operational history, Valagro has pioneered the field of bionutritionals.



12 Subsidiaries around the world | **7** Key manufacturing facilities | **80+** Countries with distribution and commercial presence | **600+** Employees around the world

GeaPower TODAY FOR TOMORROW

GEAPOWER

Using science to harness the potential of nature with an eye toward environmental sustainability: this is the principle on which GeaPower is based. It is the **exclusive technology** platform developed by Valagro in order to turn potential active ingredients into high quality nutrient solutions. Thanks to GeaPower, we can offer solutions based on sustainable innovation that, by using the **most modern technologies,** borrow valuable active ingredients from nature and return them to nature itself to obtain **healthier, richer, better harvests.**

GeaPower certifies an approach to excellence based on four fundamental concepts:

In-depth knowledge of active ingredients and raw materials

• This enables Valagro to identify, characterize and preserve specific active ingredients that can achieve targeted physiological responses in plants.

Proprietary extraction processes

• Customized extraction processes help maintain the correct ratio of each ingredient in complex natural mixtures.

Advanced screening and investigation technologies

• Genomics, phenomics and other "omic" sciences allow Valagro to decipher the genetic and molecular triggers for specific physiological responses in plant systems.

• Screening of hundreds of samples per experiment.

Proven ability to provide commercially viable solutions

• Extensive experience with field experiments.

• The commercial function and research function are closely integrated.

• This allows Valagro to fast-track product candidates with the best chance of attaining commercial viability.

A NATURAL SYNERGY WITH OUR CUSTOMERS

Valagro ACADEMY

Alongside the distinctive offer of solutions constructed around a continuous commitment to research and development, Valagro regards customer focus as a value to be implemented to the fullest. As such, it has decided to expand its offer by including highly innovative and **specialized services for** its **Standard, Silver, Gold and Platinum customers.**

The Valagro Academy

Valagro Academy provides training sessions that involve the Sales team at each group subsidiary in order **to share information and updates** on the world of plant nutrition and bionutritionals, along with specific sessions on products, local needs and the most appropriate solutions for them. In addition to the Sales team of each subsidiary, Valagro customers can benefit from this **highly specialized knowledge** through **training sessions** based on specific needs and local experiences, and can be assisted in choosing the best solutions to be applied in the field.

Be a part of Valagro's digital Community.
Explore the brand-new app e-Hub.
Join us here!

VALAGRO® E-HUB THE BRAND-NEW APP

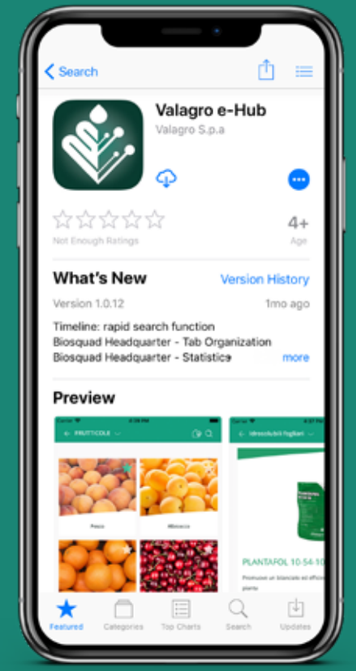
E-Hub is the brand-new app designed by Valagro placing the organization's innovation and knowledge into the hands of all users worldwide. The application is the digital path to communicate with our partners, customers, distributors and all people interested in Bionutritionals, fertilizers and the AG world.

Valagro shares the best practices and support improved decision quality.

- Easy and real-time access
- Multi-tools Platform providing different features just in 1 App
- Direct contact and knowledge sharing with Valagro people
- Always with you on your mobile, laptop and tablet

Download on the App Store

GET IT ON Google Play



Valagro's Path to Drive Up Quality, Sustainability and Safety

From Environmental Protection 1

At the end of the 1990s, Valagro began its course for total high quality, starting with the environment and ISO 14001.

Today, there is a dedicated staff that uses its expertise for the protection of the environment and for the improvement of quality and safety, inside and outside the company boundaries.

To Product Quality 2

Involved since the foundation in pursuing the highest quality standards of products, in 2001 Valagro obtained ISO 9001 certification. Already structured and widely prepared for quality management, in a short time we implemented ISO 9001, predisposing the company also to the procedures for traceability.

Health and Safety 3

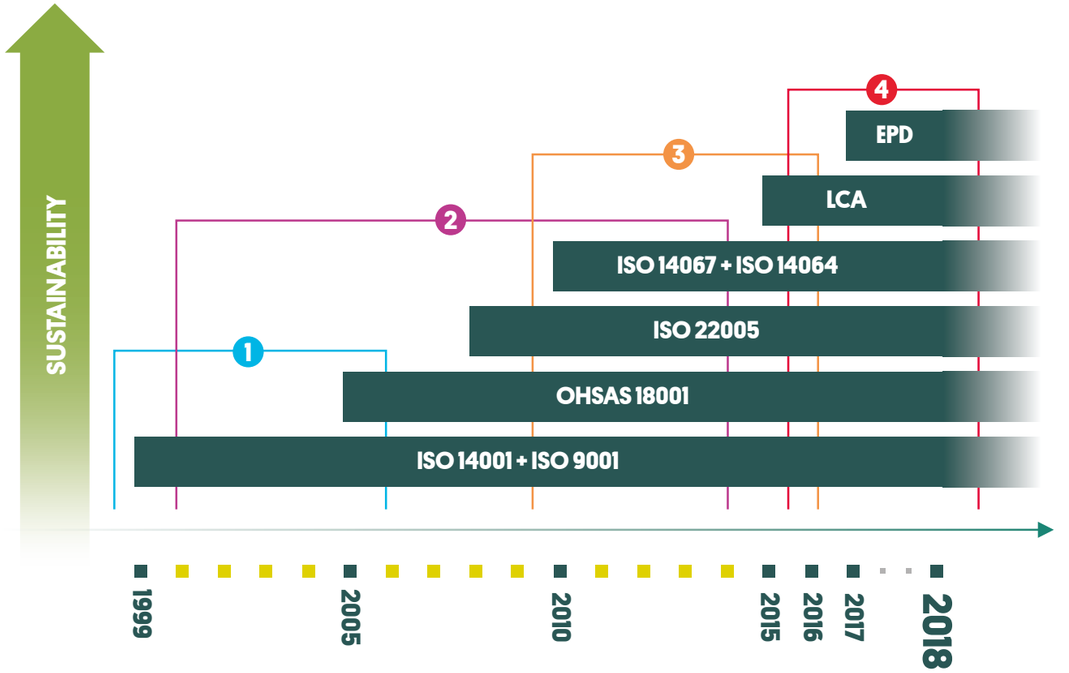
Worker safety has always been at the center of corporate strategies: over the years accidents have declined from an average of 8.1 from 2001-2003 to 1.3 from 2013-2015. Furthermore, the attention to safety has been improved by the continuous training of all the staff with approximately 4000 hours of lessons for 160 courses and 1400 people involved to date.

Traceability 3

Always with a view to high, total quality, Valagro implements the tracing system to all its products. The role as a global partner in the challenges of modern agriculture has required this system to handle any difficulties in the cycle of the supply.

Sustainability, Life cycle and Climate change 4

Valagro has spent increasing attention to the life cycle concept in the assessment of environmental impact of its products. Today, in the development of new production lines, we consider not only environmental impacts generated in company boundaries, but also, those deriving from raw materials and by the usage of our products on field. After completing the study of the Carbon Footprint for all its products, in 2014-15 Valagro obtained ISO 14067 certification for 4 products and in 2015 obtained ISO 14064 (Corporate Carbon Footprint) certification for emission from its headquarters. Today, the company is engaged in the analysis of the life cycle of all its productions (Life Cycle Assessment) to arrive in the coming years to the EPD certification (Environmental Product Declaration), that defines and communicates to external stakeholders all the environmental performances of its products linked to the problem of climate change (CFP), environmental issues (reduction of the ozone layer, eutrophication of water, acid rain ... etc).



ROW CROP SOLUTIONS

GLIMO: more nutrients and energy

YIELDON: yield increase

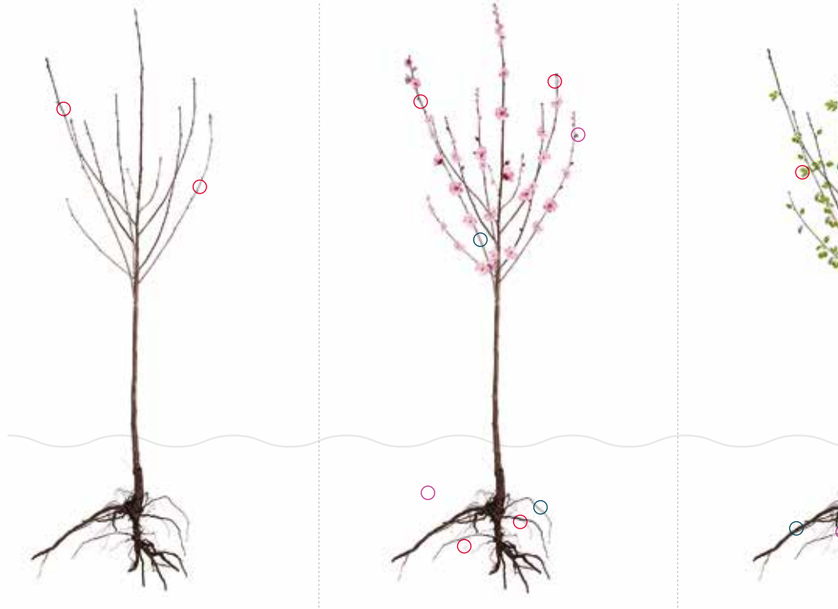
ORCHARD SOLUTIONS

ERGER: advances and synchronizes bud break

MC CREAM: fruit size
MC SET+ BOROPLUS: flowering setting

MC EXTRA: vegetative-reproductive balance

MC EXTRA: vegetative-reproductive balance



Foliar application

Root application

RETROSAL:saltstress

ACTIWAVE: nutrient uptake

ACTIWAVE: nutrient uptake

Phenological stages

DORMANCY

FLOWERING

VEGETATIVE DEVELOPMENT FRUIT GROWTH

RIPENING

VEGETABLE SOLUTIONS

Foliar application

Root application

MC CREAM: photosynthesis efficiency

MC CREAM: fruit size
MC SET+ BOROPLUS: flowering setting

MC EXTRA: Vegetative-reproductive balance

SWEET: ripening

RADIFARM: root promoter

RETROSAL: salt stress
ACTIWAVE: nutrient uptake
CALBIT C: calcium deficiencies

RETROSAL: salt stress
ACTIWAVE: nutrient uptake
CALBIT C: calcium deficiencies

Phenological stages

TRANSPLANT | VEGETATIVE DEVELOPMENT | FLOWERING | FRUIT DEVELOPMENT | FRUIT RIPENING

PLANT BIONUTRITIONALS

Our exclusive line of bionutritionals gives farmers a line of products with active ingredients of purely natural origin, which stimulate the main physiological processes of the plant while promoting their growth and productivity.

ACTIWAVE

Increases the absorption of nutrients

Increases the plant's ability to absorb the nutrients in the soil. Optimizes mineral fertilization.

ACTIWAVE is unique and innovative for enhancing the absorption of nutrients in the soil and optimizes their use in the plant. The exclusive formula is protected by a European patent application.

SIZE CHART

2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Root application	ACTIWAVE FERTIGATION — ALL All crops	Applications during the crop cycle in presence of a well-developed root system	5-6 qts/acre

ACTIWAVE: Phenomic Evidence

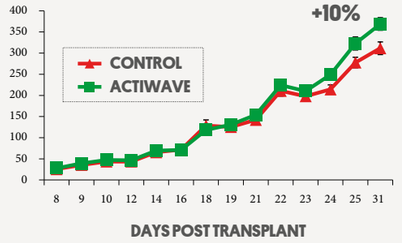
Phenomic tests with ACTIWAVE were performed at Valagro @PHENOlab Research Center by using the Lemnatec Scanalyzer 3D digital measurement station.

TARGET: To evaluate the improvement in the digital biomass and root uptake in limiting growth conditions like the presence of hard water, after treating plants with ACTIWAVE, compared to untreated test.

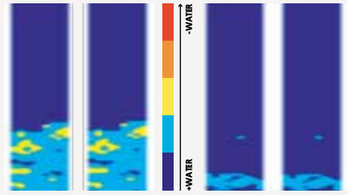
CROP: Tomato *cv.* Ikram;
TRIAL CONDITIONS: Cylinders for phenomic analysis;
APPLICATIONS: 12 and 22 days post transplant.

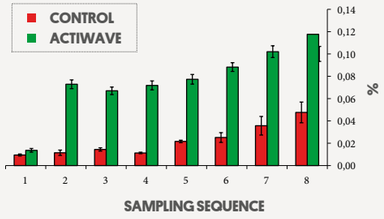
RESULTS

1. RGB (Red-Green-Blue): Digital Biomass



2. NIR (Near Infrared): Water Uptake Index





Plants treated with Actiwave have shown an increase in the digital biomass (+10%) compared to the untreated test. NIR results highlight an improved root uptake in the plants treated with Actiwave, as suggested by the decrease of water level in the cylinders, with reference to the water color scale.

ERGER

Advances and synchronizes bud break

Advances and synchronizes bud break, achieving early and uniform ripening of fruits.

In areas where the necessary chilling requirements are not satisfied, for example due to a mild winter season, the application of ERGER allows the plant to start the metabolic processes that lead to the interruption of dormancy by advancing and synchronizing bud break.

SIZE CHART

2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Wood application	Cherries	Apply 45 days (± 5) before bud break.	5-6 gal/100 gal of solution
	Table grapes	Apply 60 days (± 5) before bud break. Consider the anticipation of bud break.	6-7 gal/100 gal of solution

ERGER: Phenomic Evidence

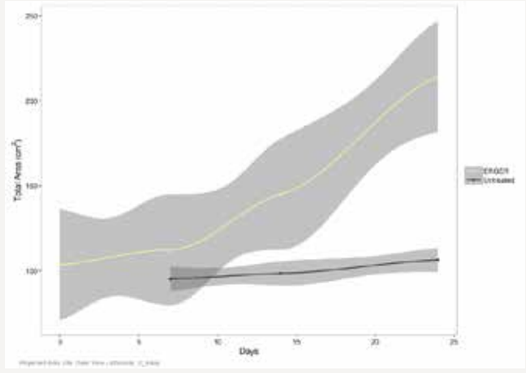
Phenomic tests with ERGER were performed at Valagro @PHENOlab Research Center by using the Lemnatec Scanalyzer 3D digital measurement station.

CROP: Table grape. VARIETY: Victoria.

RESULTS

TREATMENT	TIMING
ERGER 6% + ACTIV ERGER 16%	60 DAYS (±5) BEFORE BUD BREAK.
UNTREATED	

We started to evaluate the total vegetative area at 5, 10, 15 and 20 days after bud break.



KENDAL

Nourishes and strengthens the plant naturally

Helps plants to remain vigorous in hostile growth conditions.
Allows a better yield in terms of quantity and quality.

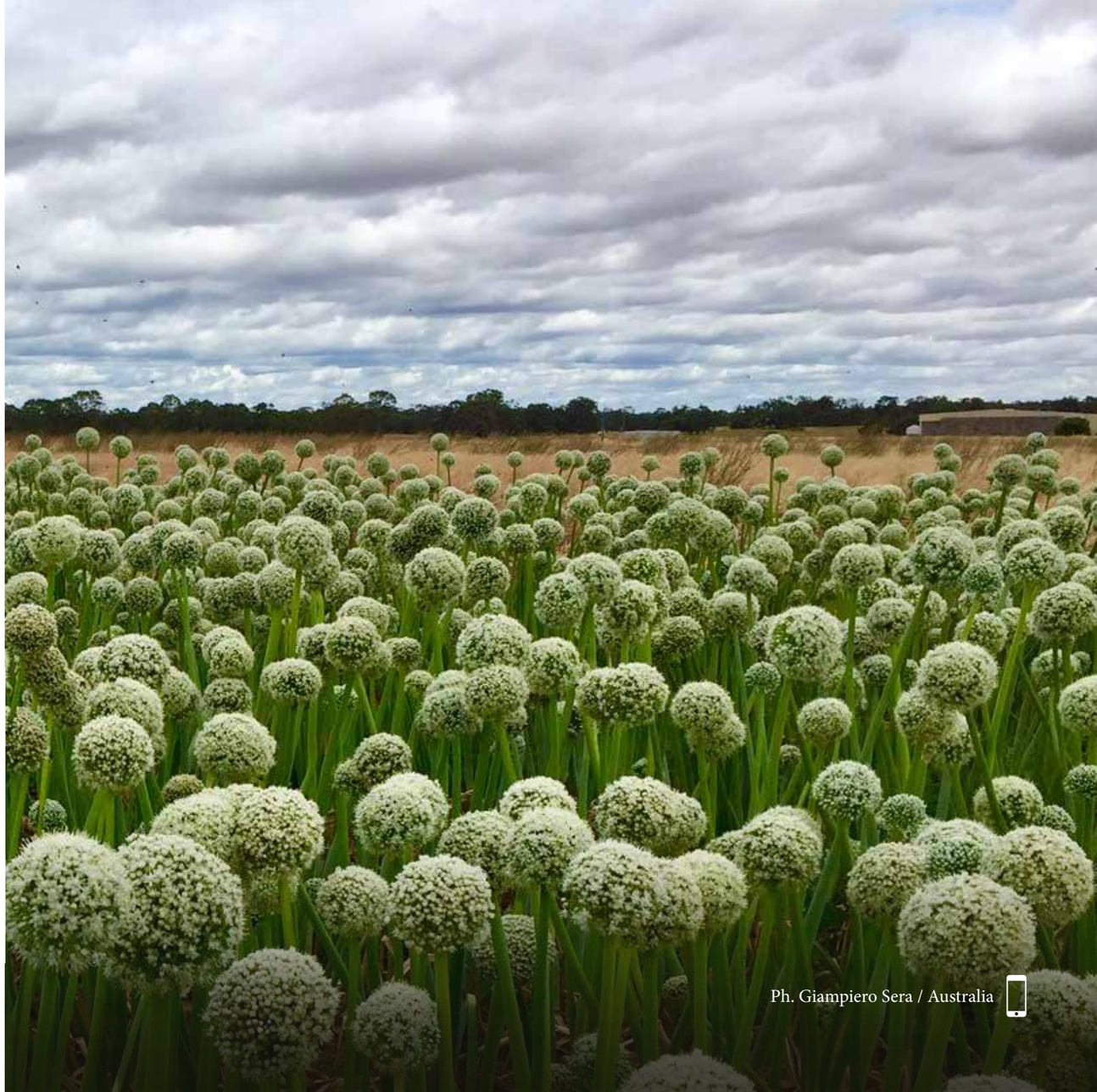
KENDAL allows the entire plant system to be supported in the face of stress factors, promoting antioxidant function within the plant's cells.

SIZE CHART

2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE	RECOMMANDATIONS
Foliar application	Vegetables	Every 14 days throughout growing season	1.0-1.5 qt/acre	Copper based formulations can be applied on olives, grapes, potatoes and artichokes. In other crops, perform tests on selected varietal before extending the treatment. The product has an acid reaction. It is therefore recommended not to associate it with compounds with a strong alkaline reaction. Physical properties: refer to Safety Data Sheet
	Berries & Leafy Vegetables	Every 14 days throughout growing season	1.0 qt/acre	
	Fruits & Nuts	Every 14 days throughout growing season	1-2 qt/acre	
	Field & Forage Crops	During the early/late vegetative, flowering, grain/boll/tuber/nut sizing stages as necessary. Every 14 days before each cut	20-32 oz/acre	
	Flowers	Every 14 days throughout growing season	1.0 oz/ 1000 sq. ft	
Fertigation	Fruit & Vegetable Crops	Every 14 days throughout growing season	3.5-4.5 qt/acre	



Ph. Giampiero Sera / Australia

MC CREAM

Increases photosynthetic activity and production

Based on Ascophyllum nodosum extracts.

MC CREAM has a formulation with a high concentration of active phyto-ingredients extracted from the algae *Ascophyllum nodosum*, combined and processed to stimulate the plant growth by increasing the metabolic and photosynthetic activity.

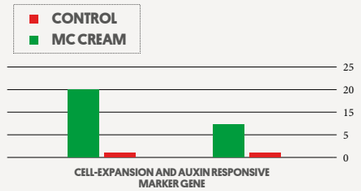
SIZE CHART 2.5 gal

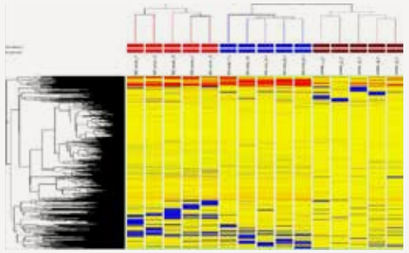
DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Pome Fruits	1st application: Flowering 2nd application: Fruit Set 2-3 applications every 7-10 days	2-4 qts/acre
	Stone Fruits	2-3 applications every 5-7 days from dying sepal crown	2-4 qts/acre
	Potato	1-2 applications every 5-7 days from beginning of tuber formation	2-3 qts/acre
	Vegetables	Applications from first clusters flowering, every 7-10 days, repeat for subsequent flowerings	2-3 qts/acre
	Strawberry	2-3 applications every 7-10 days from flowering	2-3 qts/acre
	Artichoke	2-3 applications every 7-10 days from differentiation of central flower head	2.5-3 qts/acre

A biological characterization

The adoption of **innovative investigation techniques** ("omic" sciences) provides a quick and reliable **biological characterization** of the effect of active compounds.
The aim is to understand how substances interact with crop physiology. Here is a focus on MC Cream, where our omic analyses demonstrated that the product **enhances photosynthetic activity and growth**, and how it does it.





Genomics

MC CREAM induced the expression of specific genes involved in photosynthesis and growth by: **20 fold** of a light-responsive marker gene linked to response to high light intensity, and **7 fold** of another marker gene involved in cell-expansion-proliferation and response to auxin stimulus.

Phenomics

Treatments with MC CREAM 24h or 48h before inducing stress from high light intensity **protect the photosystems** and consequently preserve gas exchange, normal transpiration and growth.

Metabolomics

MC CREAM treated plants are healthier in connection with stress situations. In fact, it has been observed:

- **Decrease in stress-related compounds** (terpenes, terpenoid alkaloids, inulin, glucosinolates, flavonoids, homocysteine and homoserine, as well as phytoalexins).
- **Increased porphyrin**, suggesting that photosynthetic capacity was improved.
- **Increase in methionine biosynthetic intermediates**, likely connected to improved assimilation of nutrients or chlorophyll and membrane synthesis, cell division, synthesis of cell wall.

MC EXTRA

Improves vegetative-reproductive balance

Based on *Ascophyllum nodosum* extracts.

MC EXTRA is a readily and totally soluble concentrate in microflakes formulation based on active biomolecules extracted from the algae *Ascophyllum nodosum*. The biologically active ingredients ensure a quantitative increase in production while maintaining optimal, balanced vegetative growth.

SIZE CHART 2.2 lb 5 lb 44 lb

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Pome Fruits	From the first petals falling 2-3 applications every 7-10 days	0.5-1.5 lbs/acre
	Stone Fruits	From the beginning of of fruit swelling 2-3 applications every 7-10 days	0.5-1.5 lbs/acre
	Grape- Kiwi Fruit	1st application: Bud- Wool Stage - Green Shoot Tips 2nd application: Visible branches - Pre-flowering	0.5-1.5 lbs/acre
	Vegetables (tomato, pepper, eggplant, zucchini, cucumber)	From development of plant to flowering: Application every 7-10 days	0.5-1.5 lbs/acre
	Other Vegetables	Plant development Applications every 10-15 days	0.5-1.5 lbs/acre
	Strawberry	From vegetative recovery 2 applications every 7-10 days	0.5-1.5 lbs/acre
	Flowers	From plant development to pre-flowering: Applications every 7-10 days	0.5-1.5 lbs/acre
	Row Crops	1 application at vegetative development	0.5-1.5 lbs/acre

MC SET

Stimulates flowering and fruit setting

Based on *Ascophyllum nodosum* extracts.

MC SET is a formulation based on active phyto-ingredients extracted from the algae *Ascophyllum nodosum*.
The complex of biomolecules within the product is enriched with a mineral fraction of Boron and Zinc which gives the product a considerable capacity to stimulate the flowering and fruit setting processes.

SIZE CHART 2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Fruit Crops	Beginning of flowering/flowering. May be repeated every 7-10 days thereafter through the fruit/nut sizing period	20-30 oz/acre
	Vegetables	Apply 30 days after transplant or after branching/ row covering is applicable. May be repeated every 10-14 days	1-2 qt/acre
	Tree & Vine Crops	Beginning of flowering/flowering. May be repeated every 7-10 days thereafter through the fruit/nut sizing period	20-30 oz/acre
	Field Crops	Apply early to mid-bloom, at pegging (peanuts) or 8-10 leaf stage (sugar beets). A second application may be applied 10-14 days later.	16 oz/acre

Ph. Chad Lessard / U.S.A.

RADIFARM

Root promoter reduces transplant stress

Ensures root flush of transplanted or replanted plants. Reduces the time to overcome post transplant stress.

RADIFARM was developed for applications during the transplant phase and/or in the early stages of development of various crops. It promotes the formation of rich and advanced root systems by extending the existing roots and issuing new absorbent roots.

SIZE CHART 2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE	
Fertigation	Vegetables	1st application at transplant 2nd application 7 days after 1st application	(Transplant rate) 1.0 qt/100 gal	2-2.5 qts/acre
	Nut Crops	1st application at transplant 2nd application 7 days after 1st application	(Transplant rate) 1.0 qt/100 gal	2-2.5 qts/acre
	Fruit & Orchard Crops	1st application at transplant 2nd application 7 days after 1st application	(Transplant rate) 1.0 qt/100 gal	2-2.5 qts/acre
	Ornamental & Potted Plants	1st application at transplant 2nd application 7 days after 1st application	(Transplant rate) 1.0 qt/100 gal	2-2.5 qts/acre

RADIFARM: microphenotyping test

Bioassay GUS on *Arabidopsis thaliana*. Using the GUS reporter method on Arabidopsis plants, we provided evidence that RADIFARM biomolecules modulate the concentration and localization of auxins which could account for the enhanced lateral root formation.

RADIFARM

UNTREATED

Plant roots treated with RADIFARM (left picture) show moderate to intense blue coloration compared to untreated control (right). Blue color and its intensity identify the auxin signaling activation; higher perception of auxin signaling results in a more intense coloration. The blue distribution can be seen in tissues where signaling is activated.

RELEASEED

Increases germination energy

Stimulates earlier, uniform and vigorous germination of seeds.

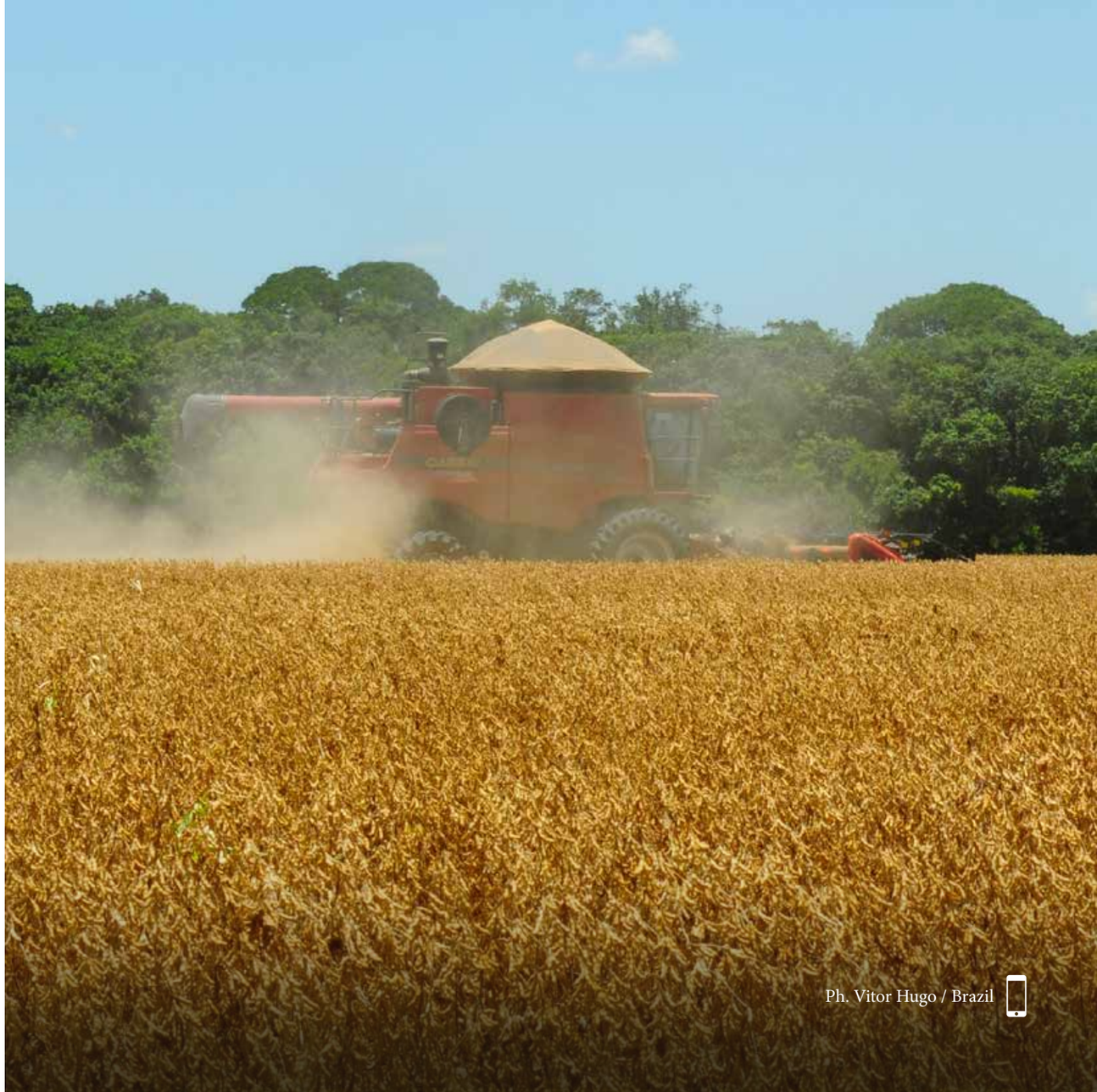
RELEASEED is a seed-treatment formulation that improves the germination process in plants and promotes a strong “starter” effect in the initial development stage. The product enhances germination energy and stimulates the metabolic processes and early growth of seedlings while also supporting rapid lateral root development.

SIZE CHART

2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Seed Treatment	Wheat	Seed treatment	COMING SOON
	Corn	Seed treatment	
	Soybean	Seed treatment	
	Cotton	Seed treatment	



RETROSAL

Improves nutrient availability under salinity stress

Promotes and controls plant growth in saline soils.

RETROSAL improves plant growth on saline soils. The enriched formulation of RETROSAL, thanks to the innovative GeaPower technology (GEA216), is the right solution to keep plants growing vigorously and to ensure high quality and yields under high salinity soil conditions by restoring plant health and improving water retention.

SIZE CHART 2.5 gal

DIRECTION FOR USE

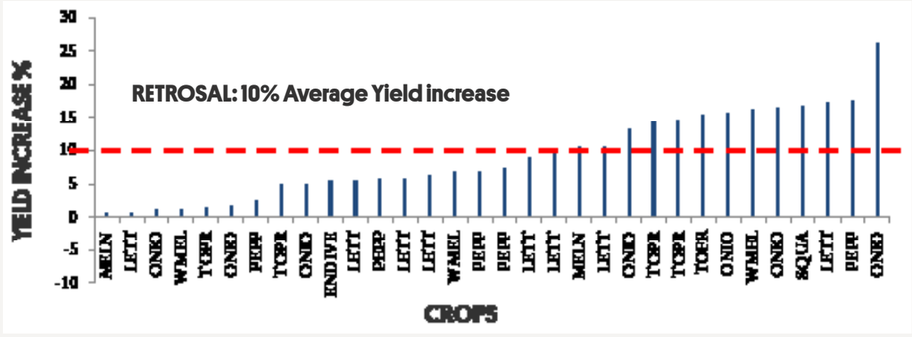
APPLICATION METHOD	CROP	SOIL TYPE	APPLICATION TIMING	RATE
Fertigation	ALL All crops	Clay soils	During entire crop cycle	2-3 gal/acre 2 applications
	ALL All crops	Sandy soils	During entire crop cycle	1-2gal/acre 2-3 applications

RETROSAL: How does it work in salt conditions?

Accumulation **of salts** in soil is one of the most important **worldwide problem** that induces **crop losses**. Soil salinization, arising from either natural or human-induced causes, led to an increase in concentration of dissolved salts in the soil profile to a level that impairs food production, environmental health and socio-economic well-being (Ondrasek et al., 2009a; Rengasamy, 2006).

The application of RETROSAL under salinity stress activates genes/pathways involved in **osmotic adjustment** and synthesis of **compatible solutes** to tolerate salinity stress condition and confer protective properties. In addition, it induces the biosynthesis of compatible osmolytes that can **afford protection of cells against a variety of salinity stress,** induces the biosynthesis of physical **protective barriers that reduce accumulation of toxic compound, and finally improves energy pathways to support plant growth under salinity conditions.**

RETROSAL 2 gal/acre - % yield vs UTC



RETROSAL worldwide trials on vegetables under salinity stress condition.

PLANT BIONUTRITIONALS

SWEET

Ripening promoter

Increases sugar concentration.

SWEET is a bionutritional that promotes sugar production and accelerates the biochemical processes of ripening.

SIZE CHART

2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Citrus	At the end of fruit enlargment At the beginning of fruit ripening	2-3 pts/acre
	Apple, pear, peach, apricot, cherry, plum, nectarine	Pre-veraison; veraison	2-3 pts/acre
	Wine grape, table grape	Pre-veraison; veraison	2-3 pts/acre
	Melon, watermelon	Fruit development after summer vegetative stasis (2 applications)	2 pts/acre
	Strawberry	From whitening of fruits every 8-10 days	2 pts/acre
	Flowers	Pre-flowering (1-2 applications)	16-20 fl oz/acre
	Sugarbeet	2 treatments during root growth	2 pts/acre

Ph. Amol Rangnathrao Munde / India

Ph. Saul Humberto Borbolla Garate / Mexico

YIELDON

Highest crop productivity, highest return for farmers

Valagro switches "ON" row crop profitability.

The most innovative technologies such as Genomics, Phenomics and Next Generation Sequencing are concentrated in the revolutionary YieldON: a bionutritional able to increase row crops productivity and return for farmers. More than 65% of the composition, on a dry base is characterized, by a selection of extracts from three distinct families of plants and seaweeds enriched with trace elements Mn, Zn and Mo.

SIZE CHART — 5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Wheat	1 application at flag leaf growth stage	2 pts/acre
	Soybean	2 applications: the 1st at Vn/R1 growth stage, the 2nd at R3/R5 growth stage	1- 2 pts/acre
	Corn	1-2 applications during V10-R2	1-2 pts/acre
	Cotton, oil seed rape (canola)	2 applications. The first mixed with pesticide/herbicide treatment, the 2° at the beginning of flowering	1- 2 pts/acre
	Sunflower	From whitening of fruits every 8-10 days	2 pts/acre

YIELDON: The innovative way to get it

We carried out an integrated "omics & field-trials" approach to characterize the physiological effect of YieldON.

GENOMICS | PHENOMICS | NEXT GENERATION SEQUENCING | EXPERIMENTAL FIELD TRIALS

High efficiency phenotyping analysis: plant growth dynamics of soybean plants untreated and treated with YieldON

Several experimental trials demonstrate the effectiveness of the product in the field.

Brazilian case study

EXPERIMENTAL CENTERS	CROPS	PRODUCTIVITY INCREASED BY YIELDON VS STANDARD
RIO VERDE UNIVERSITY	SOYBEAN (VAR. 7338)	258 KG/HA
EXPERIMENTAL STATION	SOYBEAN (VAR. 7338)	480 KG/HA
EXPERIMENTAL STATION	SOYBEAN (VAR. IPRO)	276 KG/HA
RIO VERDE UNIVERSITY	CORN (VAR. 3646 PIONEER)	1404 KG/HA
CERES EXPERIMENTAL STATION	CORN (VAR. RB 9110 RPO)	448,8 KG/HA
CERES EXPERIMENTAL STATION	COTTON (VAR.FIBERMAX 980 GLT)	444 KG/HA

Calculate with ROI calculator tool present in our Valagro Website www.valagro.com/en/yieldon/ the Return On Investment you can get thanks to YieldON

Thanks to "Next Generation Sequencing Technology" we obtained an accurate detection of all expressed genes, even for agronomically relevant crops like corn and soybean. Our results complement, at the molecular and morphometric/physiological levels, the evidence obtained in field trials.

AVERAGE YIELD INCREASE BY 13%

+ 9 sacs/ha* avg

* in Brazil the soybean yield is evaluated in sacs per hectare

VIVA

Improves the rhizosphere efficiency and the vegetative productive balance

Rhizhospere improver. It increases yield.

VIVA revitalizes and improves the structure and biochemical activity of the rhizosphere, promoting plant growth and ensuring the correct balance between the vegetative and productive part of the plant.

SIZE CHART 2.5 gal 265 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Fertigation	Vegetable Crops	1st application: 14-21 days after transplant 2nd application: Start of bloom 3rd application: During fruit sizing	1-2 gal/acre
	Shrub, Berry & Bush Crops	1st application: 14-21 days after transplant or greenup 2nd application: Pre-bloom 3rd application: During fruit sizing	1-2 gal/acre
	Forage/Grass Crops	1st application: At greenup Subsequent applications: 7-10 days after each cutting	16-24 oz/acre
	Field Row Crops	In furrow or 2x2 band with or without liquid starter fertilizer	24-46 oz/acre
	Tree & Vine Fruit Crops	1st application: At greenup 2nd application: At bloom 3rd application: After fruit set	1-2 gal/acre
	Nut Crops	1st application: At greenup 2nd application: At bloom 3rd application: After fruit set	1-2 gal/acre
	Ornamentals	1st application: 14-21 days after transplant or during vegetative development. Subsequent applications: 7-10 days.	1-2 gal/acre

VIVA: Microphenotyping test. A phenotyping platform for chemical biology.

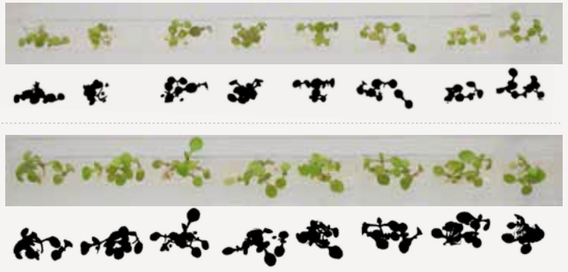
The **microphenotyping** is a novel technique that allows detailed phenotyping of whole *Arabidopsis thaliana* seedlings to evaluate **plant response to phytoactive compounds**. This system is based in a novel seedling growth device called "Phytostrips", that assembled with standard 96-well plates, making possible to conduct detailed studies of **changes in plant development**, especially in **root morphology** and root **system architecture**.

Phytostrips are filled with nutrient gel and seeds are sown on the surface. After seed germination, treatments are applied by adding the test compounds to the liquid nutrient medium that diffuse through the gel to be absorbed by the growing roots. Root growth can be followed by imaging through the transparent walls of phytostrips and shoot development by imaging from above. (Burrell *et al.* 2017)

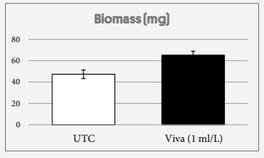
VIVA : effect on biomass and projected leaf area

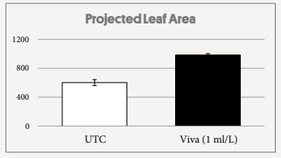
Untreated

VIVA (1ml/L)



VIVA specifically induces an **increase in biomass** and **projected leaf area** respectively of **38%** and **64%**, as highlighted in the above pictures and diagrams.





MICRONUTRIENTS

Valagro developed specific micro-nutrient formulations that quickly supply those nutrients with low environmental impact. Micro-nutrients promote healthy and strong plant growth.

Complete plant nutrition **1**

Prevent or cure micro-nutrient deficiencies **2**

Improve crop quality **3**

BOROPLUS

Cure and prevention of boron deficiencies

BOROPLUS is effective in the prevention of Boron deficiency. BOROPLUS can be mixed with the more common foliar applied products. BOROPLUS contains boron complexed with ethanolamine and the liquid formulation allows perfect uniformity of distribution of the product, for fertigation or foliar application. BOROPLUS improves flowering and fruit setting, optimizing yield.

SIZE CHART 2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Tree & Vine Fruits	3 applications starting at beginning of flowering	1-1.5 pts/acre
	Vegetables	Application from beginning of flowering	1-1.5 pts/acre
	Olives	Pre-flowering and/or post-setting	1.5 pts/acre
	Row crops	Early plant grwoth stages	1-1.5 pts/acre
	Flower Crops	Pre-bud formation	1-1.5 pts/acre
Fertigation	Fruit Crops	At starting vegetative growth	3-5 pts/acre
	Row crops	Distribute before sowing or before pre-emergence crop stages alone or mixed with herbicides	3-4 pts/acre
	Flower & Ornamental Crops	Distribute before transplanting or during fastest vegetative growth development	3-4 pts/acre

CALBIT C

Cure and prevention of calcium deficiencies

CALBIT C promotes rapid translocation of calcium in fruits and flowers. Mixable with the most common pesticides CALBIT C contains calcium complexed with LSA, specific for the prevention and treatment of deficiencies on fruits and leaves. CALBIT C increases fruit firmness and, consequently, longer shelf life. CALBIT C can be used for fertigation as well as for foliar application.

SIZE CHART 2.5 gal

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Fruit crops	Application every 10-15 days starting from fruit setting	1.5-2.5 pts/acre
	Vegetables	Weekly applications from 8-10 days after transplant	2-3 pts/acre
	Ornamentals & Leafy Vegetables	Applications every 8-10 days during the crop cycle	2-3 pts/acre
Fertigation	ALL All crop	Applications post fruit setting	1-3 pts/acre

GREENBELT

Treatment & prevention of iron deficiency

GREENBELT (0-0-0) is a source of Iron and Manganese chelates readily available for crops, especially in alkaline soil conditions. The product is to be applied into the root zone through drip line, drench, injection, band application (watering in the solution).

SIZE CHART

5 lbs

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Fertigation	Fruit Crops	2-3 treatments starting from vegetative growth	5-15 lbs/acre per application
	Row Crops	At planting or when deficiency symptoms first appear	5-15 lbs/acre per application
	Vegetable Crops	1-2 treatments according to plant needs after planting	5-15 lbs/acre per application
	Floriculture	At planting or when deficiency symptoms first appear	4-6 oz/1000 sq. ft

Ph. Ana Paula Neto / Brazil

GLIMO

More energy for your plants

GLIMO is a new generation of nutritional product. The innovative formulation developed by Valagro is powered by the GeaPower technology (GEA075). GLIMO is a mixture of fully chelated micro-nutrients combined with a bio-nutritional active ingredients. The synergy action between micro-nutrients and these specific active ingredients in the formulation, allows the plant to grow better.

SIZE CHART 5 lbs

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Soybean	Post-emergence (2 to 6 trifoliate leaves) Glyphosate application	0.5 lb/a for a light deficit soils 0.75 lb/a for moderate deficit soils 1.0 lb/a for heavy deficit soils
	Corn	Post-emergence - Glyphosate application (V2 to v6)	0.5 lb/a for a light deficit soils 0.75 lb/a for moderate deficit soils 1.0 lb/a for heavy deficit soils
	Cotton	Pin head square to early bloom	0.5 lb/a for a light deficit soils 0.75 lb/a for moderate deficit soils 1.0 lb/a for heavy deficit soils
	OTHER Other crops	During vegetative growth	(1-2 lb/acre) repeated as necessary

GLIMO Ca

To prevent and cure calcium deficiencies

GLIMO is a new generation of nutritional product. The innovative formulation developed by Valagro is powered by the GeaPower technology (GEA075). GLIMO is a mixture of fully chelated micro-nutrients combined with a bio-nutritional active ingredients. The synergy action between micro-nutrients and these specific active ingredients in the formulation, allows the plant to grow better.

SIZE CHART 5 lbs

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Vegetables	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	0.25-2.0 lbs/broadcast acre
	Tree & Vine Fruits	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	2-8 oz/tree or 0.25-2.0 lbs/broadcast acre
	Shrub, berry & bush crops	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	2-4 lbs per 100 bushes or 0.25-2.0 lbs/broadcast acre
	ALL Nut Crops		2-8 oz/tree or 0.25-2.0 lbs/broadcast acre
	Field Row Crops & Forage/Grass Crops	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	0.25-2.0 lbs/broadcast acre
	OTHER Golf Course Greens	Apply in early spring when greens are actively growing. 4 or more applications can be made at monthly intervals to maintain color and vigor. Applications should always be made late in the evening or early morning to reduce potential for phytotoxicity	0.5 lb/acre (43,650 sq. ft) in a minimum 150-200 gal of water
	OTHER Nuts	3 or more applications per year to maintain vigorous turf	0.25-2.0 lbs/acre in a minimum of 40 gallons of water

MICRONUTRIENTS

GLIMO Fe

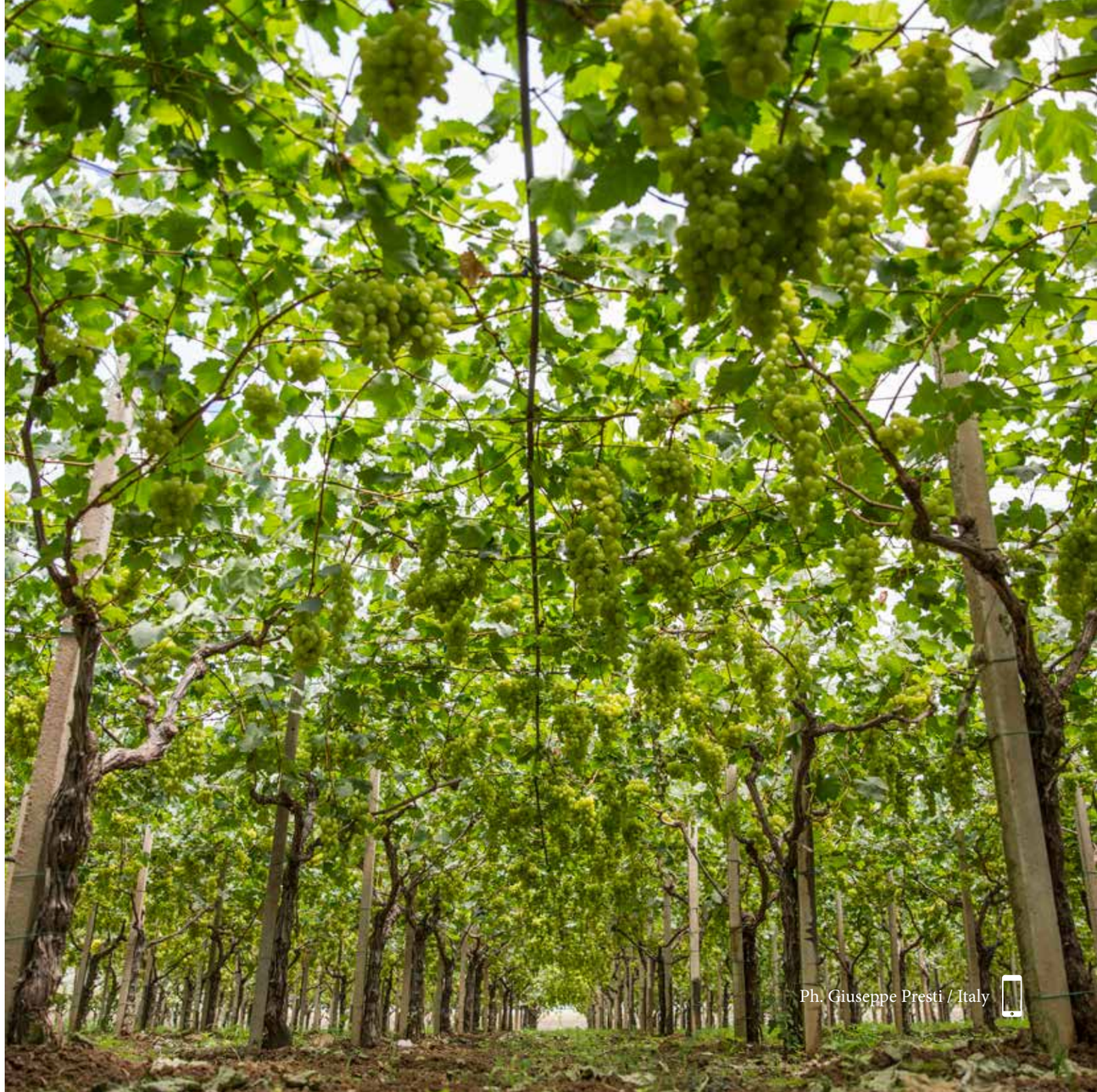
To prevent and cure iron deficiencies

GLIMO is a new generation of nutritional products. The innovative formulation developed by Valagro is powered by the GeaPower technology (GEA075). GLIMO is a mixture of fully chelated micro-nutrients combined with a bio-nutritional active ingredients. The synergy action between micro-nutrients and these specific active ingredients in the formulation, allows the plant to grow better.

SIZE CHART 5 lbs

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Vegetables	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	0.25-2.0 lbs/broadcast acre
	Tree & Vine Fruits	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	2-8 oz/tree or 0.25-2.0 lbs/broadcast acre
	Shrub, berry & bush crops	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	2-4 lbs per 100 bushes or 0.25-2.0 lbs/broadcast acre
	ALL Nut Crops		2-8 oz/tree or 0.25-2.0 lbs/broadcast acre
	Field Row Crops & Forage/Grass Crops	Apply maintenance (lower) during vegetative growth and then 14-21 days until deficiency symptoms disappear	0.25-2.0 lbs/broadcast acre
	OTHER Golf Course Greens	Apply in early spring when greens are actively growing. 4 or more applications can be made at monthly intervals to maintain color and vigor. Applications should always be made late in the evening or early morning to reduce potential for phytotoxicity	0.5 lb/acre (43,650 sq. ft) in a minimum 150-200 gal of water
	OTHER Nuts	3 or more applications per year to maintain vigorous turf	0.25-2.0 lbs/acre in a minimum of 40 gallons of water



Ph. Giuseppe Presti / Italy

HIDROMIX S

Cure and prevention of micro-nutrients deficiencies

HIDROMIX S is a mixture of chelated trace elements especially designed for use in soil-less or open field crops. The trace elements are present according specific ratios between micro-nutrient in order to fulfill the needs of consumption of the main vegetables crops.

SIZE CHART

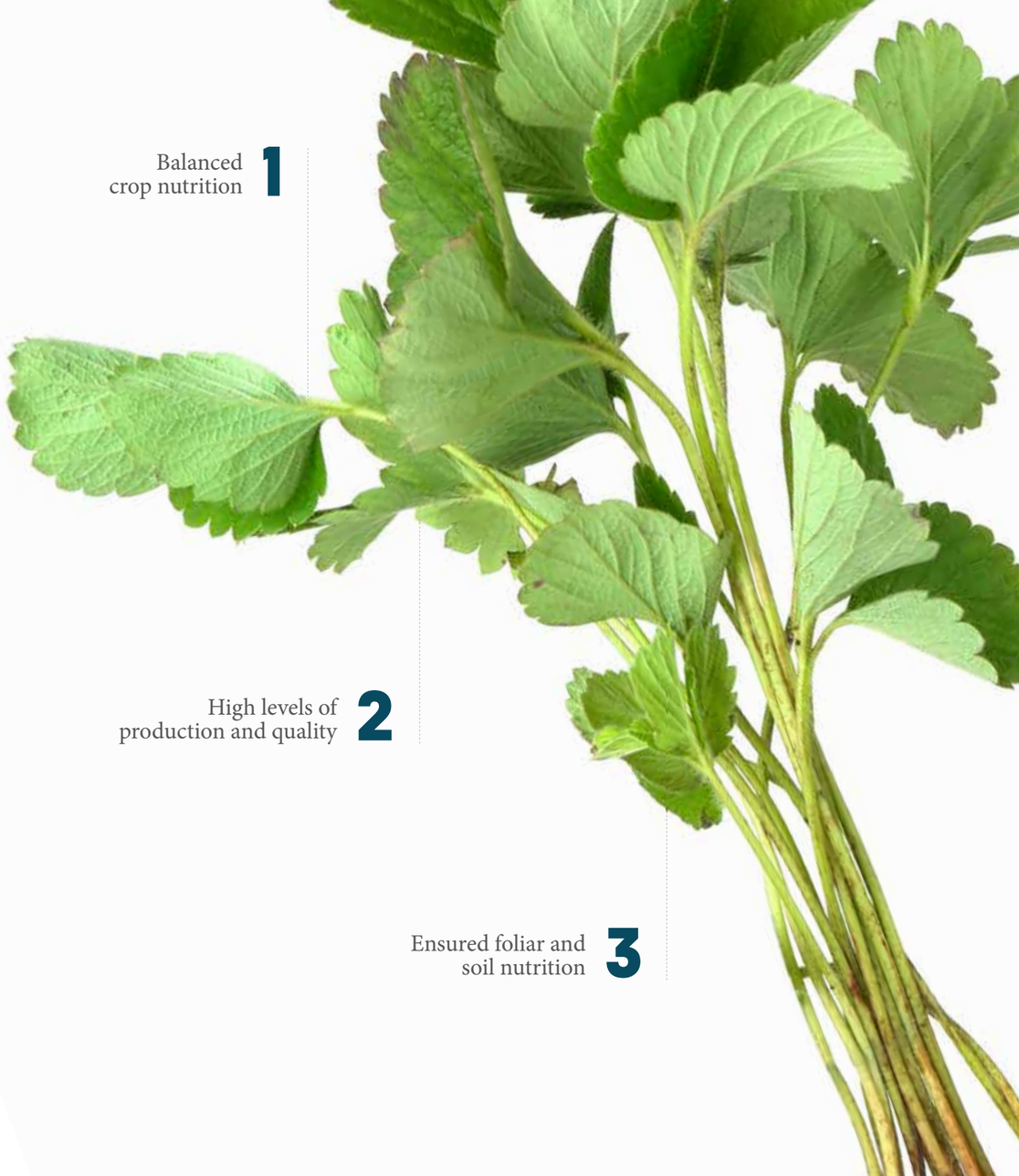
5 lbs

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Foliar application	Grapes, kiwifruit, citrus, pome fruit	Applications every 15-20 days starting from the first appearance of deficiency symptoms	3-3.5 oz/25 gal
	Stone fruit, vegetables (tomato, peppers, melon and watermelon)	Applications every 15-20 days starting from the first appearance of deficiency symptoms	1.5-3 oz/25 gal
Fertigation	ALL Fruit Crops	Preventive treatments	9-27 lb/acre
	ALL Vegetable & Ornamentals	Curative treatments	2.6-5.3 lb/acre
Hydroponic soilless crop	Vegetable and flower crops	During all crop cycle	3-4 kg/m3 water

WATER SOLUBLE NUTRITION

The WSN lines, specific for both fertigation and foliar application, offer a wide range of solutions, consisting of micro-crystalline NPK formulations. These fertilizers are enriched with chelated micro-elements for quick and complete nutrition.



Balanced crop nutrition **1**

High levels of production and quality **2**

Ensured foliar and soil nutrition **3**

FERTIGATION

The WSN lines, specific for fertigation application, offers a wide range of solutions for different nutritional needs and phenological phases, consisting of micro-crystalline NPK formulations.

WATER SOLUBLE NUTRITION

MASTER LINE

Nourishes and supports the plant growth

Sodium and Chlorine free. Completed with chelated trace elements (EDTA).

MASTER LINE is a complete range of water-soluble micro-crystalline fertilizers that are completely soluble and specific for fertigation systems. The different formulations have been designed to meet the nutritional needs of all crops, in each crop phase and for each type of soil, ensuring improved yields and quality.

SIZE CHART 25 lbs

DIRECTION FOR USE

APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Fertigation	Fruit Crops	During the crop cycle	5-15 lbs/acre/day
	Vegetable Crops	During the crop cycle	5-15 lbs/acre/day
	Flowers	During the crop cycle	5-15 lbs/acre/day

MASTER SUPREME

Guarantees a complete nutrition with a bionutritional effect

The high quality WSN enriched with biologically active ingredients.

MASTER SUPREME is the new line of high quality water-soluble fertilizers, enriched with biologically active ingredients which guarantee both, nutritional and bionutritional effects. The innovative formulations, based on GeaPower Technology (GEA582), stimulate metabolism and ensure a greater increase of quantity and quality of production.

SIZE CHART 25 lbs

DIRECTION FOR USE

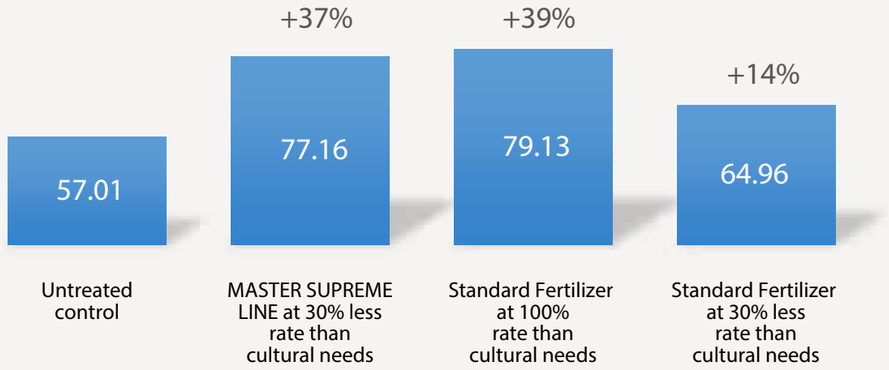
APPLICATION METHOD	CROP	APPLICATION TIMING	RATE
Fertigation	Fruit crops	During the crop cycle	5-20 lbs/acre
	Vegetable crops	During the crop cycle	5-20 lbs/acre
	Flowers	During the crop cycle	5-20 lbs/acre

MASTER SUPREME LINE: The follow-up

MASTER SUPREME LINE thanks to the biologically active ingredients inside its formulations enhances nutrient use efficiency, ensuring higher yields with good quality.

MASTER SUPREME applications guarantee a sustainable nutrient management, with a reduced nitrogen and potassium leaching and reduced phosphorus fixation. Valagro experience confirms that MASTER SUPREME LINE is able to provide an yield increase equal to what would be obtained with a standard fertilizer but using a 30% less rate.

AVERAGE YIELD/PLOT (KG)



SAMPLING SEQUENCE

The graph above shows the results, in terms of production, of the trials made in Italy on melon in 2016, with MASTER SUPREME LINE. We compared the untreated control with Master Supreme at a 30% less rate than the cultural needs and with a standard fertilizer at 100 % rate than the cultural needs.

PLANT BIONUTRITIONALS

PHYSICAL PROPERTIES

PRODUCT	pH (1% solution)	Density (g/cm3) 20°C	Color	Conductivity E.C. -1‰ (mS/cm) 18°C
ACTIWAVE	6.4	1.29	black	0.25
ERGER	6.0	1.25	brown	0.526
KENDAL	4.7	1.29	light brown	0.38
MC CREAM	3.9	1.08	green	0.13
MC EXTRA	9.2	45.0	black	0.59
MC SET	8.5	1.13	black	0.125
RADIFARM	5.0	1.21	brown	0.28
RELEASEED	-	-	-	-
RETROSAL	3.4	1.3	brown	0.43
SWEET	6.5	1.35	violet	0.54
VIVA	6.2	1.24	black	0.29
YIELDON	-	1.2	black	0.22

COMPOSITION (w/w %)

PRODUCT	Formulation	Total nitrogen (N)	Organic nitrogen (N)	Ureic nitrogen (N)	Nitric nitrogen (N)	Ammoniacal nitrogen (N)	Potassium oxide soluble in water (K2O)	Phosphorus pentoxide (P2O5)	Organic carbon soluble in water (C)	Calcium oxide (CaO)	Calcium Complexed with LSA
ACTIWAVE	Liquid	3.00	1.00	2.00	-	-	7.00	-	12.00	-	-
ERGER	Liquid	15.00	-	6.10	5.80	3.10	-	-	-	4.70	-
KENDAL	Liquid	3.50	0.30	3.20	-	-	15.50	-	3.00	-	-
MC CREAM	Suspension	-	-	-	-	-	-	-	-	-	-
MC EXTRA	Micro-Flakes	-	1.00	-	-	-	20.00	-	20.00	-	-
MC SET	Liquid	1.00	-	-	-	-	20.00	-	-	-	-
RADIFARM	Liquid	3.00	1.00	2.00	-	-	-	-	10.00	-	-
RELEASEED	Liquid	-	-	-	-	-	-	-	-	-	-
RETROSAL	Liquid	-	-	-	-	-	3.00	-	-	8.00	1.40
SWEET	Liquid	3.00	-	-	-	-	3.00	-	-	10.00	-
VIVA	Liquid	3.00	1.00	2.00	-	-	8.00	-	8.00	-	-
YIELDON	Liquid	3.00	1.00	2.00	-	-	3.00	-	10.00	-	-

Tables follow with main declarations in labels as they are driven by regulatory requirements. So they may change according to variations in labeling rules intervening at local level; as a consequence, some declarations may be omitted here. Always refer to official labels for the concerned country.

COMPOSITION (w/w %)

PRODUCT	Magnesium oxide (MgO)	Betaines	Mannitol	Boron (B)	Copper (Cu)	Iron (Fe)	Molybdenum (Mo)	Manganese (Mn)	Zinc (Zn)
ACTIWAVE	-	-	-	-	-	0.50	-	-	0.08
ERGER	-	-	-	-	-	-	-	-	-
KENDAL	-	-	-	-	-	-	-	-	-
MC CREAM	-	-	-	-	-	-	-	1.50	0.50
MC EXTRA	-	0.20	4.00	-	-	-	-	-	-
MC SET	-	-	-	0.50	-	-	-	-	1.50
RADIFARM	-	-	-	-	-	-	-	-	0.10
RELEASEED	-	-	-	-	-	-	0.50	2.0	-
RETROSAL	-	-	-	-	-	-	-	-	0.20
SWEET	1.00	-	-	-	-	-	-	-	-
VIVA	-	-	-	-	-	0.02	-	-	-
YIELDON	-	-	-	-	-	-	0.20	0.50	0.50

MICRONUTRIENTS

PHYSICAL PROPERTIES

PRODUCT	pH (1% solution)	Density (g/cm3) 20°C	Color	Conductivity E.C. -1‰ (mS/cm) 18°C	Solubility (g/100ml)
BOROPLUS	7.70	1.37	yellow	0.20	-
CALBIT C	8.00	1.45	brown	0.65	-
GLIMO	6.80	0.80	brown	0.41	30
GLIMO CA	5.90	-	light brown	-	20
GLIMO FE	4.70	-	dark yellow	-	10
HIDROMIX S	5.50	1.10	brown	0.30	10

COMPOSITION (w/w %)

PRODUCT	Formulation	Chelating Agent	Chelated Fraction	Potassium oxide soluble in water (K2O)	Calcium oxide (CaO)	Magnesium oxide (MgO)	Boron (B)	Copper (Cu)
BOROPLUS	Liquid	Ethanolammine	100%	-	-	-	11.00	-
CALBIT C	Liquid	LSA	100%	-	15.00	-	-	-
GLIMO	Microgranules	EDTA	-	-	-	-	-	-
GLIMO CA	Microgranules	EDTA	-	8.00	-	-	-	-
GLIMO FE	Microgranules	EDTA	-	4.00	-	-	-	-
HIDROMIX S	Soluble Microgranules	EDTA; Fe EDDHSA	100%	-	-	-	0.65	0.27

PRODUCT	Iron (Fe) (orto-orto)	Manganese (Mn)	Molybdenum (Mo)	Zinc (Zn)
BOROPLUS	-	-	-	-
CALBIT C	-	-	-	-
GLIMO	-	10.00	-	1.00
GLIMO CA	0.75	-	-	-
GLIMO FE	7.00	3.00	-	1.00
HIDROMIX S	7.00	3.30	0.20	0.60

WATER SOLUBLE NUTRITION

PHYSICAL PROPERTIES

PRODUCT	pH (1% solution)	Color	Conductivity E.C. -1‰ (mS/cm) 18°C	Solubility (g/100ml)
MASTER 13-40-13	4.7	Orange	1.053	42
MASTER 20-20-20	5.1	Blue	0.914	55
MASTER 3-37-37	4	Red	1.756	25
MASTER SUPREME BALANCED	6.5	Red	0.1	10
MASTER SUPREME STARTER	5.9	Red	0.91	10
MASTER SUPREME DEVELOPMENT	5.6	Red	0.6	10
MASTER SUPREME FLOWERING	5.9	Red	1.13	10
MASTER SUPREME RIPENING	6.1	Red	1.19	10

COMPOSITION (w/w %)

PRODUCT	Formulation	Total nitrogen (N)	Ureic nitrogen (N)	Nitric nitrogen (N)	Ammoniacal nitrogen (N)	Phosphorus pentoxide (P2O5)	Potassium oxide soluble in water (K2O)
MASTER 13-40-13	Soluble Micro-crystals	13.00	-	3.70	9.30	40.00	13.00
MASTER 20-20-20	Soluble Micro-crystals	20.00	10.40	5.60	4.00	20.00	20.00
MASTER 3-37-37	Soluble Micro-crystals	3.00	-	3.00	-	37.00	37.00
MASTER SUPREME BALANCED	Soluble Micro-crystals	8.00	2.80	-	4.70	24.00	24.00
MASTER SUPREME STARTER	Soluble Micro-crystals	11.00	-	2.60	8.40	42.00	42.00
MASTER SUPREME DEVELOPMENT	Soluble Micro-crystals	5.00	-	3.90	-	10.00	10.00
MASTER SUPREME FLOWERING	Soluble Micro-crystals	20.00	14.00	5.00	-	5.00	5.00
MASTER SUPREME RIPENING	Soluble Micro-crystals	18.00	7.50	5.10	5.40	18.00	18.00

PRODUCT	Magnesium oxide (MgO)	Sulphuric anhydride (SO3)	Boron (B)	Copper (Cu)	Iron (Fe)	Manganese (Mn)	Molybdenum (Mo)	Zinc (Zn)
MASTER 13-40-13	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER 20-20-20	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER 3-37-37	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER SUPREME BALANCED	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER SUPREME STARTER	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER SUPREME DEVELOPMENT	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER SUPREME FLOWERING	-	-	0.02	0.005	0.07	0.03	-	0.01
MASTER SUPREME RIPENING	-	-	0.02	0.005	0.07	0.03	-	0.01

A Father:
Sows with love
Nurtures with care
Harvests with pride

NOTES

NOTES


Valagro
Where science serves nature