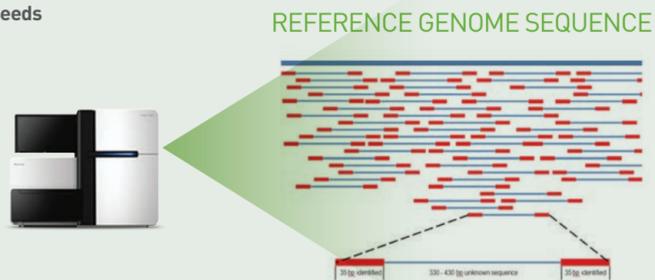


HOW DOES YIELDON INCREASE PRODUCTIVITY?

Next Generation Sequencing (NGS) allowed us to detect expressed genes, related to the increase of plant productivity, directly on **corn** and **soybean**. Thanks to this technology we explained the **mode of action** of YieldOn at molecular level:

1. **Better transport of sugars and nutrients**
2. **Promotion of cell division > more and larger seeds**
3. **Fatty acids biosynthesis and transport***



Plants treated with YieldOn were compared to untreated control plants using Next Generation Sequencing (NGS) > This resulted in the identification of **949 differentially expressed genes for corn** and **134 for soybean**. Such differentially expressed genes are present also in other row crops of interest.

* observed in soybean only

OVERVIEW OF MOLECULAR RESULTS DESCRIBING YIELDON MODE OF ACTION

Among all the genes differentially expressed by YieldOn (949 for corn and 134 for soybean) compared to untreated, we selected the most significantly up-regulated ones, and categorized them in 3 functional categories linked to yieldon mode of action.

MODE OF ACTION OF YieldON	RELATED GENE NAME	ACTIVITY	FOLD**	REFERENCES	INSIGHT
1. BETTER TRANSPORT OF SUGARS AND NUTRIENTS	zinc iron transporter	zinc and iron uptake and transport	27	Li, 2013	<p>YieldON improves uptake and transport of the nitrate and the microelements Zn and Fe, and at the same time increases phosphate use efficiency.</p>
	asparagine synthase	ammonium/nitrogen assimilation	4	Bernard, 2009	
	SPX domain-containing protein	phosphate homeostasis (uptake, sensing)	19	Secco, 2012	
	NRT1/PTR family protein	nitrate/peptide/hormone transporter	30	Léran, 2014; Chiba, 2015	
	polyol/monosaccharide transporter	phloem loading	8	Slewinsky, 2011; Klepek, 2007	
	glutamine synthetase	nitrogen/ammonium assimilation	9	Krapp, 2015; Thomson, 2014	
2. PROMOTION OF CELL DIVISION (MORE AND LARGER SEEDS)	alanine aminotransferase	nitrogen assimilation	12	Good, 2007	<p>The coordination of specific hormonal processes, including catabolism of excess cytokinins and subsequent establishment of an optimal auxin/cytokinin balance, leads to optimal cell division and proper seed development/maturation.</p>
	cytochrome b5 hydroxylase	cytokinin catabolism	12	Jameson, 2016; Werner, 2003	
	iaa16 - auxin-responsive (aux iaa family member)	auxin-activated signaling, pathway, regulation of transcription	4	Czapla, 2003	
3. FATTY ACIDS BIOSYNTHESIS AND TRANSPORT	trigalactosyl diacylglycerol protein	lipid transport to the chloroplast membrane; photosynthesis	6	Nguyen et al., 2016; Hurlock, 2014	<p>Importance of fatty acids biosynthesis, a fundamental trait for value in food and industrial applications.</p>

**up-regulated genes compared to untreated test

DIRECTIONS FOR USE

We performed several experimental trials worldwide. This approach allowed us to define **the best application methods, timing and rates** at different conditions and latitudes.

Recommended dosage/ha: **2L/ha**



METHOD OF APPLICATION	CROP	TIMING	RATE
Foliar	Wheat	1 application at flag leaf growth stage	2 l / ha
	Soybean	2 applications: the 1st at Vn/R1 growth stage, the 2nd at R3/R5 growth stage	1-2 l / ha
	Corn	1 application At V4-V6 growth stage	2 l / ha
	Rice	2 applications: the 1st at the beginning of booting, the 2nd at heading growth stage	1-2 l / ha
	Cotton	2 applications: the 1st before squares appear and 2nd after 3-4 weeks	1-2 l / ha
	Oil seed rape (Canola)	2 applications. The first mixed with pesticide/herbicide treatment, the 2 ^o At the beginning of flowering	1-2 l / ha
	Sunflower	1 application at 4-6 leaf growth stage	2 l / ha

BRAZILIAN CASE STUDY



Product tested together with the most important experimental centers.



EXPERIMENTAL CENTERS	CROP	PRODUCTIVITY INCREASED BY YIELDON VS STANDARD
Rio Verde University	Soybean (var. 7338)	+ 258 Kg/ha
CooperCitrus Experimental Station	Soybean (var. 7338)	+ 480 kg/ha
SEEDS 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

AVERAGE YIELD INCREASE OF **13%**



Valagro switches "ON" row crops profitability. The most innovative technologies such as Genomics, Phenomics and Next Generation Sequencing are concentrated in the revolutionary YieldOn: the ideal product to increase the productivity of industrial crops, in a natural way and in full respect of plant physiology. The result is an optimal return on investment for the farmer, who can count on a harvest of higher value guaranteed by Valagro. www.valagro.com



Valagro S.p.A.
Zona Industriale Via Cagliari, 1
66041 Atessa (CH) - Italia

Tel: +39 0872 881.1
Fax: +39 0872 897.416
www.valagro.com





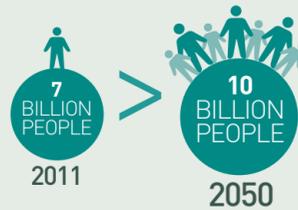
WHAT IS YIELDON ?

YieldOn is a biostimulant **able to increase row crops productivity** modulating cell metabolism, division, expansion, improving also transport of sugars and nutrients, besides lipid biosynthesis and transport.

ROW CROPS MARKET NEED > INCREASE PLANT PRODUCTIVITY AND RETURN FOR FARMERS



Row crops represent the most important crop in terms of global cultivated area. Such crops include soybean, maize, wheat, rice, rapeseed, sunflower, and cotton. Row-crops agriculture is an intensive system of farming used in order to obtain high yields, which employs elevated quantities of organic and mineral fertilizers. Considering this, and the decrease in area of arable land, it becomes crucial to ensure high yield and quality using alternative strategies, such as the use of plant biostimulants.



VALAGRO EXPANDS ITS PRESENCE IN THE ROW CROPS MARKET

Through innovation, passion and knowledge Valagro expands its presence in the row crops market, introducing a dedicated biostimulant named "YieldOn", with the **main aim to help farmers to produce more and obtain the highest return of investment.**



WHY CHOOSE YIELDON ?

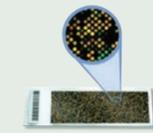
- A NEW COMBINATION OF EXTRACTS NEVER USED BEFORE
- HIGHER RETURN FOR FARMERS
- CLEAR TECHNICAL POSITIONING AND EASY TO USE
- DEVELOPED USING HIGHLY INNOVATIVE TECHNOLOGIES
- GOOD MISCIBILITY WITH OTHER PRODUCTS

THE INNOVATION WAY TO GET YIELDON > GEA689*

INTEGRATED APPROCHES

We carried out an integrated "omics & field-trials" approach to characterize the physiological effect of YieldOn using different model plants (*Arabidopsis thaliana*, maize and soybean). In particular, we focused on gene expression and plant phenomic analyses. Thanks to the last "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.

GENOMICS
Genomic LAB



PHENOMICS

In collaboration with METAPONTUM AGROBIOS



NEXT GENERATION SEQUENCING

In collaboration with nsure®



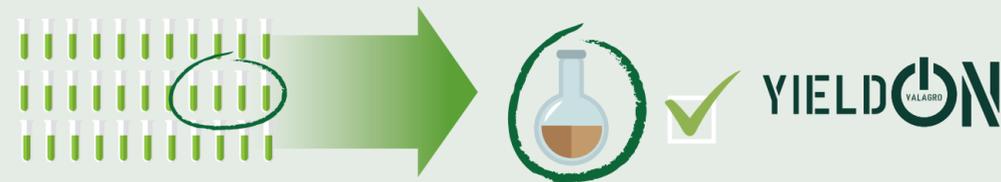
EXPERIMENTAL FIELD TRIALS

In collaboration with the most important research centers worldwide



*For YieldOn, the GEA code identifies the specific and distinctive application of GeaPower technology

A NEW COMBINATION OF EXTRACTS NEVER USED BEFORE!



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.



FUCACEAE (Seaweeds)



POACEAE



CHENOPODIACEAE

After a strict screening of different plants and seaweeds we selected these 3 families for their highest content in researched active substances.

HIGH EFFICIENCY PHENOTYPING ANALYSIS AS A TOOL IN DEVELOPING YIELDON

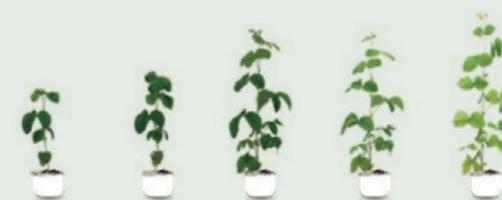
3D SCANALYZER LEMNATEC PLATFORM AND DETAIL OF ONE OF THE ROOMS WITH SOYBEAN PLANT INSIDE



(photos by courtesy of Metapontum Agrobios)

PLANT GROWTH DYNAMICS OF SOYBEAN PLANTS UNTREATED AND TREATED WITH YIELDON

Untreated

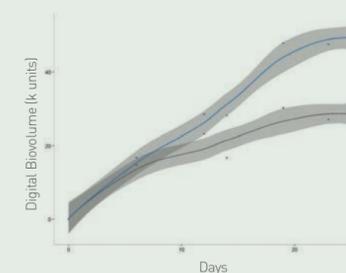


YIELDON

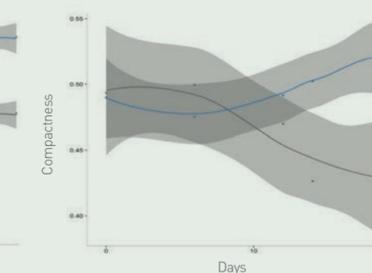


These parameters are strictly correlated to the yield increase:

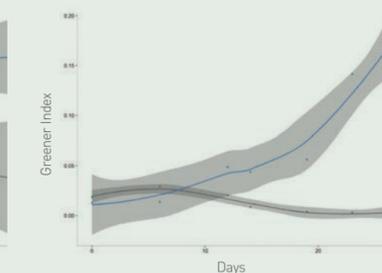
DIGITAL BIOVOLUME



COMPACTNESS



GREEN INDEX



Control YieldOn

Activity presented at PhenoDays in Berlin



Valagro is a leader in the production and commercialization of biostimulants and specialty nutrients for use in agriculture, gardening, and industrial applications. Founded in 1980 and headquartered in Atessa (Italy), Valagro is committed to providing innovative and effective solutions for plant nutrition and care. Its mission is to increase the quantity and quality of plants and harvested crops while enhancing productivity and reducing the environmental impact of cultivations.



INNOVATION ACCORDING TO GEAPOWER

Using science to seize and exploit the potential of Nature with an eye to environmental sustainability:

This is the principle behind GeaPower, the exclusive technology platform developed by Valagro in order to turn potential active ingredients into high-quality nutrient solutions. A technology based on four fundamental concepts:



Deep knowledge of active ingredients and raw materials



Selection of the extraction methods of active ingredients



Cutting edge investigations and analytical skills



Proven ability to provide effective solutions to the customer's requirements

