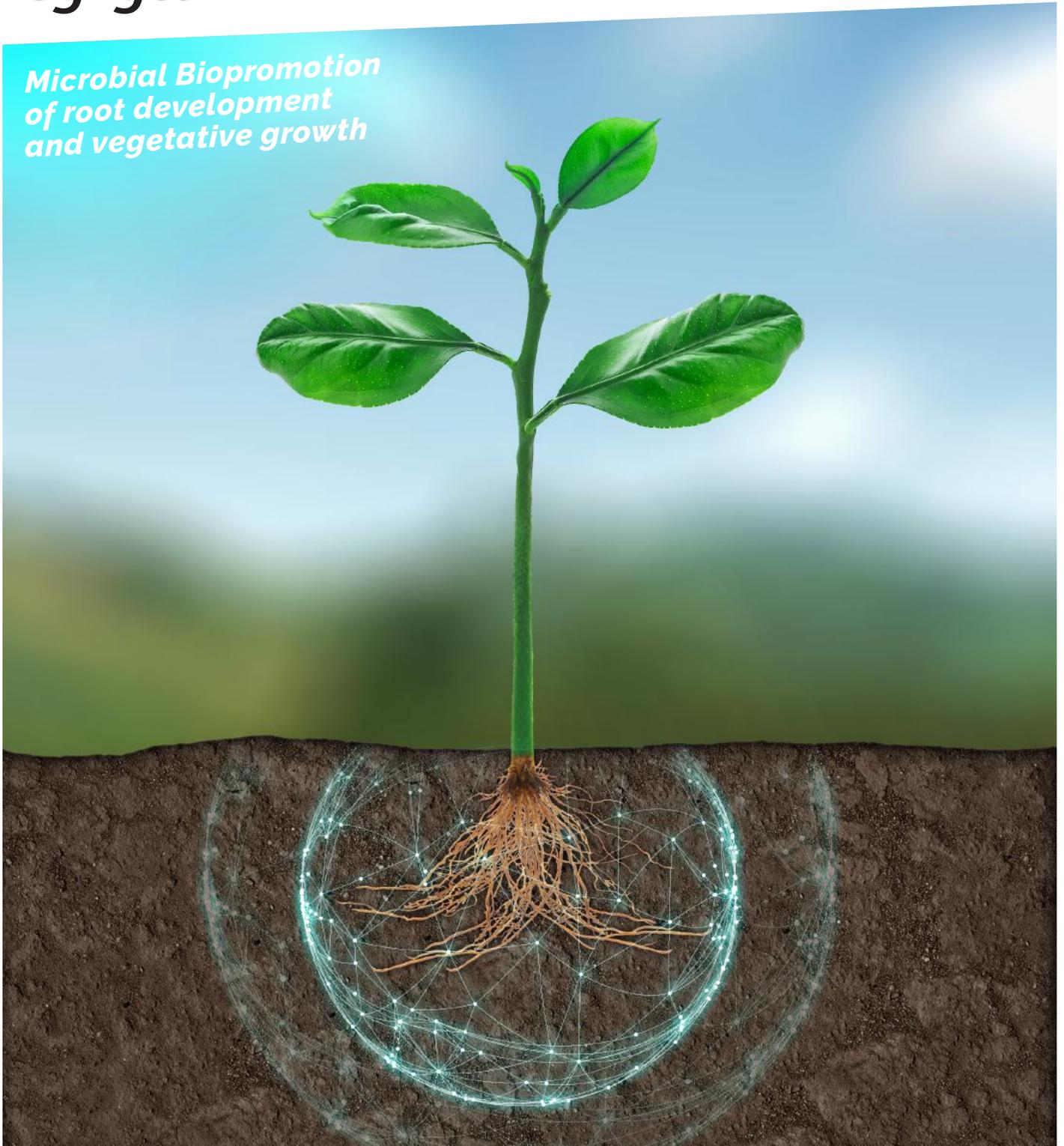




Arald Line

*Microbial Biopromotion
of root development
and vegetative growth*



+ safety



+ roots



+ production



GreenPath

Producing more and producing healthy!

Green Path is Agriges practical answer to the new challenge of modern agriculture. The project core is to develop technical means that allow achieving abundant productions, sustainable from an environmental point of view and safe for food: produce more and produce in a healthy way. The project involves the collaboration of Agriges with research institutes, experimental centres, universities, cooperatives and farms to develop products that maximize crops, production thereby reducing the use of potentially polluting chemicals.



+ safety



+ sustainable



+ production



+ quality



- chemistry



- pollution



GOAL:

PRO-ACT[®]
MICROBIAL CONSORTIUM

The telluric microflora influences soil biological properties, regulating its biochemical processes that determine a greater nutrients bioavailability and vegetative growth, because they free bio-stimulating molecules.

Thanks to the exclusive **Pro-Act** technology, Arald Line combines the synergistic effects of beneficial microorganisms that promote plant growth (PGPR and PGPF) and bioactive plant molecules to improve the well-being and productivity of crops.

These microorganisms combine the potential of mycorrhizae, rhizosphere bacteria and saprophytic fungi to stimulate plant growth. This is possible thanks to the greater availability of Nitrogen (fixation of atmospheric Nitrogen) and phosphorus (following solubilization).

Bioactive organic matrices

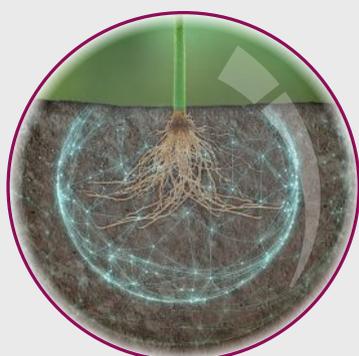
Humic and **fulvic acids** are complex organic macromolecules that come from the decomposition of the organic substance and the metabolic activity of microorganisms. They are very heterogeneous substances, classified on the basis of their molecular weight and solubility in humine (not soluble in water), humic acids (soluble in water with alkaline pH), fulvic acids, (soluble in water at all pH).

Effects of acids humic and fulvic acids:



Action on the plant

- They have a stimulating action on plant growth, in a direct and indirect manner (**auxino-like**).
- They have a direct effect on the plant stimulating the rooting process, as highlighted in numerous crops (Atiyeh et al., 2002).
- They act on the activity of radical enzymes and carriers increasing of 89 % Nitric Nitrogen uptake respect to the control and they are involved also in Nitric Nitrogen assimilation.
- The **greater root development** and the more elevated activity of Nitrate root carriers translate into greater efficiency of inorganic Nitrogen absorption and assimilation by the crop.
- Influence positively also the secondary metabolism, favouring the antioxidant accumulation and the activity of enzymatic defence to **response to environmental stress**.



Action on the soil

- Affect the **structure of the soil** and its properties as drainage and aeration, which in turn act by improving the conditions for the development of both roots and telluric microorganisms.
- Cement soil aggregate particles that result more stable and reduce the activity of ions potentially phytotoxic (for example Na^+ , Cl^-)
- Increase the **Cation-exchange capacity** and exercise a **buffer power on soil pH**, increasing the nutrients availability and reducing the loss for leaching.

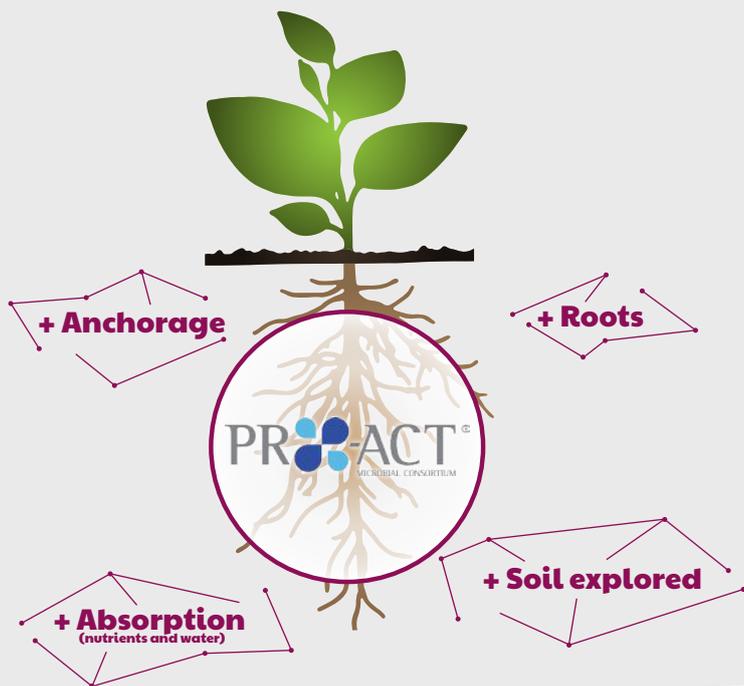
Exclusive technology production

The microorganisms of Pro-Act play an important role in improving the soil fertility and plants health. The exclusive microbial consortium was studied in collaboration with Italian research institutes and universities and they were chosen for their ability to positively influence the rhizosphere, alone and in **sinergy**.

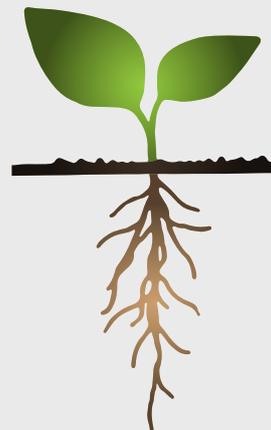


Microorganism	Action	Effects	Agron. Advantage
Arbuscular Mycorrhizal Fungi			
ARBUSCULAR MYCORRHIZAL FUNGI (GLOMUS SPP.)	They form a symbiotic association with most cultivated plants and help the plants supply phosphorus and protect them from biotic and abiotic stress	More root absorption	Reduction of transplanting-related stress or to the first stages of development
Plant Growth Promoting Rhizosphere Bacteria			
AZOTOBACTER SPP.	Genus of bacteria capable of fixing atmospheric Nitrogen (N ₂) non-symbiotically. Furthermore, some genera secrete organic acids and phosphatases by converting the insoluble forms available for the plant (Kim et al., 1998).	Greater nutrients availability	Rational supply of fertilizers
AZOSPIRILLUM SPP.	It produces phytohormones (IAA) that modify the roots growth and morphology.	Bigger roots, longer and more functional lateral roots.	Increase of exploring soil volume and greater interception of water and nutrients.
BACILLUS SPP.	It directly stimulates plant growth by improving nutrients uptake, stimulates the host plant defence mechanism before infection and can be associated with mycorrhiza fungi to improve plant growth (R.J. Akinrinlola, 2018)	It increases the amount of absorbed nutrients, plant growth and its resistance to various stresses.	Contribution of more rational technical means.
Beneficial Micorrhizal Fungi			
TRICHODERMA SPP.	Endophytic fungi, capable of living at least part of their life cycle away from the plant, colonizing the roots and, as shown recently, transfer nutrients to their guests (Behie and Bidochka, 2014). They stimulate different responses of the plant including greater tolerance to abiotic stress, efficiency in the use of nutrients, organ growth and morphogenesis (Colla et al., 2015; Shores et al., 2010)	Exponential increase of radical apparatus	Less request of nutritional input
CLONOSTACHYS SPP.	Endophytic fungi that develop inside the plant, improving its resistance to various kinds of stress. The ability of these fungus to colonize plant tissues immediately after the onset of senescence is very interesting, excluding in advance other microorganisms, even harmful (Köhl e Fokkema, 1997; Sutton e Peng, 1993).	Growth of plant more rapid and with more vigour	Greater ability to resist to factors of external stress

Treated



Not treated



Products of Arald line	Arald Cream	Arald NC	Arald Micro-N	Arald Micro-P
Formulation	CREAM	GRANULAR (Ø: 2-4 MM)	MICROGRANULAR (Ø: 0,5 - 0,7 MM)	MICROGRANULAR (Ø: 0,5 - 0,7 MM)
Application				
Microorganism				
Mycorrhizae (Glomus spp.)	5,0 %	10,0 %	5,0 %	5,0 %
RIZOSPHERA BACTERIA (SELECTED BACTERIA ISOLATES) INCLUDING:				
Azotobacter spp.	5,0 X10 ⁷ CFU/g	5,0 X10 ⁶ CFU/g	5,0 X10 ⁵ CFU/g	5,0 X10 ⁵ CFU/g
Azospirillum spp.	5,0 X10 ⁷ CFU/g	5,0 X10 ⁶ CFU/g	5,0 X10 ⁵ CFU/g	5,0 X10 ⁵ CFU/g
Bacillus spp.	7,0 X10 ⁷ CFU/g	-	-	-
SELECTION OF FUNGI/ACTINOMYCETES, INCLUDING:				
Trichoderma spp.	4,0 X10 ⁷ CFU/g	4,0 X10 ⁶ CFU/g	4,0 X10 ⁵ CFU/g	4,0 X10 ⁵ CFU/g
Clonostachys spp.	5,0 X10 ⁷ CFU/g	5,0 X10 ⁶ CFU/g	5,0 X10 ⁵ CFU/g	5,0 X10 ⁵ CFU/g
Nomurea spp.	1,0 X10 ⁷ CFU/g	1,0 X10 ⁶ CFU/g	1,0 X10 ⁵ CFU/g	1,0 X10 ⁵ CFU/g
Total Nitrogen (N) *	-	15,0 %	18,0 %	15,0 %
Total Phosphorus (P₂O₅)	-	40,0 %	-	40,0 %
Humic and Fulvic acids	✗	✓	✓	✓

Field result

The FTS (Agriges Field Technical Service) group has conducted numerous field tests, testing the products of the Arald line at various partner companies in Italy and abroad.

Pumpkin (var. Hokkaido)

Eboli, Salerno (ITALY)

The test was conducted in the greenhouse on plants of the same variety, transplanted on the same day.

The thesis treated with Arald Cream immediately showed a more vigorous growth than the not treated plant. These differences became evident at harvest, with a 30% increase in the production of plants treated with Arald Cream.



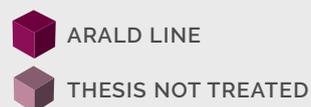
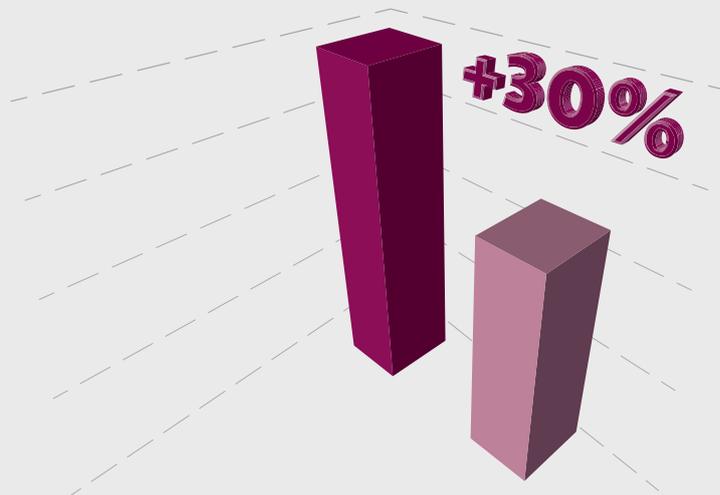
Treated



Not treated



Increasing of production



Dosi e modalità

Arald Cream	FOLIAR APPLICATION	FERTIGATION
	<p>ARBOREAL, ORTICOLE: 150-250 mL/hl from flowering to harvest.</p> <p>INDUSTRIAL: 100-200 mL/hl throughout the cycle</p>	ALL THE CULTURE: 2-3 L/ha throughout the cycle.
Arald NC	SOIL APPLICATION	
	ALL THE CULTURE: 15-25 kg/ha, to the sowing/transplant	
Arald Micro-N	SOIL APPLICATION	
	ALL THE CULTURE: 10-20 kg/ha, to the sowing/transplan	
Arald Micro-P	SOIL APPLICATION	
	ALL THE CULTURE: 10-20 kg/ha, to the sowing/transplant	

WARNINGS

Microorganisms are living organisms and, as such, can be subject to physiological drops in vitality. In case of combination with other formulations, it is recommended to carry out small miscibility and safety tests on a limited number of plants and on small surfaces.



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