





Natural products for a productive agriculture

Natürliche Produkte für produktive Landwirtschaft

Produtos naturais para a agricultura produtiva

> Naturalne produkty dla rolnictwa produktywnego

Francis Bucaille, Biocont Lab. Seminar Fruit production, Tetčice, Czech Republic, 07/12/2016



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- An agricultural French Startup created in 2011 : Privately owned
- Name inspired by the Goddess of Earth : Gaia (go!)
- GAÏAGO is specialized in Carbon and Nitrogen cycles optimization on soils and plants



A world network of soil scientists and hands-on agronomy







Who are we ?

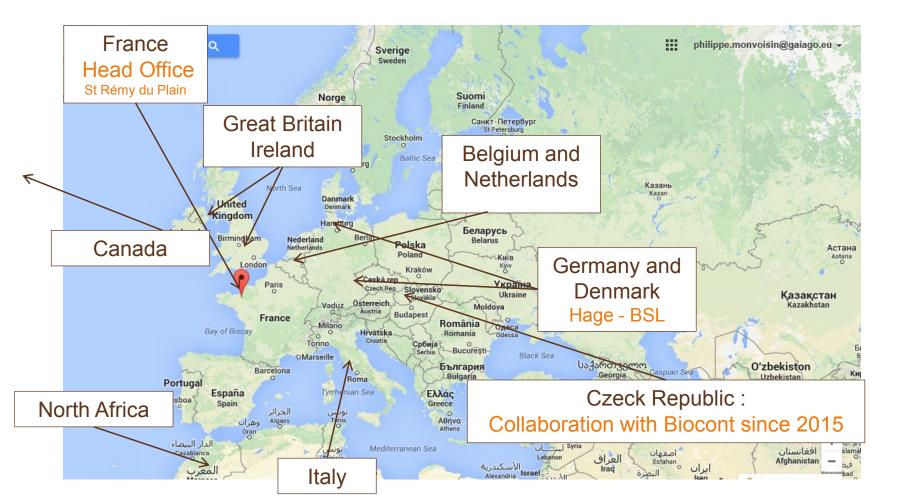
- Our main activity : conception of products based on agronomic know-how, farming world knowledge and a worldwide network of pionneering scientists
- Our products : Natural and Innovative
 - Soil conditioners
 - microbial inoculants
 - Biostimulants
 - elicitors
 - All of them can be used in organic farming in accordance with the EC regulations EC 834/2007 and EC 889/2009







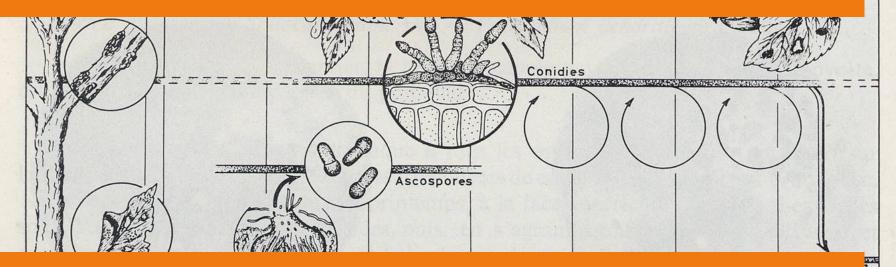
Headquarters and selling area







Our main observation regarding Fruit Trees (apple tree, plum tree, etc...)



Most of the diseases are linked to soil born pathogen or to tree nutrition failure (mainly calcium)





Exemples :



SCAB (Apple, Plum)

Infected from the soil caused by the ascomycete fungus *Venturia inaequalis*



MONILINIA (Rosaceae)

Fungi Monilinia whichcyclegothroughcontaminatedfruitsfallen on the soil



BITTER PIT (Apple, pears)

Induced by calcium deficiency

Other exemples : Oidium, Phytophtora...





One solution to limit disease pressure and decrease the use of pesticides



Make everything possible to improve soil health and tree nutrition













Fixing Nitrogen from atmosphere

Making soil minerals bioavailable

MICROBIAL INOCULANTS : Plant Growth Promoting Rhizobacteria* To secure continuous growth under all conditions for all crops





Free N 100 and Free PK characteristics

- High concentration :
 - FREE N100 : Azotobacter > 5 10¹² cfu/L. (i.e. 2.5 10¹² cfu/ha)
 - FREE PK : Bacillus mucilaginosus > 6.10¹⁰ cfu/L (i.e. 3.10¹⁰ cfu/ha)
- Shelf life : 9 months at room temperature (-3 °C to +25°C)
- Rate : 0.5 L/Ha
- Can be used in organic farming (Ecocert and FiBl certification)





Why using Free N 100?

- To reach high yields in situations where synthetic nitrogen use is limited or forbidden by regulations.
- To get high yields in spite of unfavorable and versatile weather conditions
- To get a diversification of sources of nitrogen : health of plants and quality of grapess juices/wine





Why using Free PK?

- To make bio available phosphorus, potash, calcium, boron and other minerals in the rhizosphere
 - Improvement of soil minerals flows
 - Regular feeding of plants
- To make more profitable use of not very soluble phosphates



HOW DOES FREE N and PK WORK ?

Rhizospheric microbiology feeds on root exsudates, stores and releases nutrients when necessary

Bacteriaes : growth factors and vitamins = Enhancement of the rooting system

A plant exsudates up to 40% out of its photosynthetic products !!!

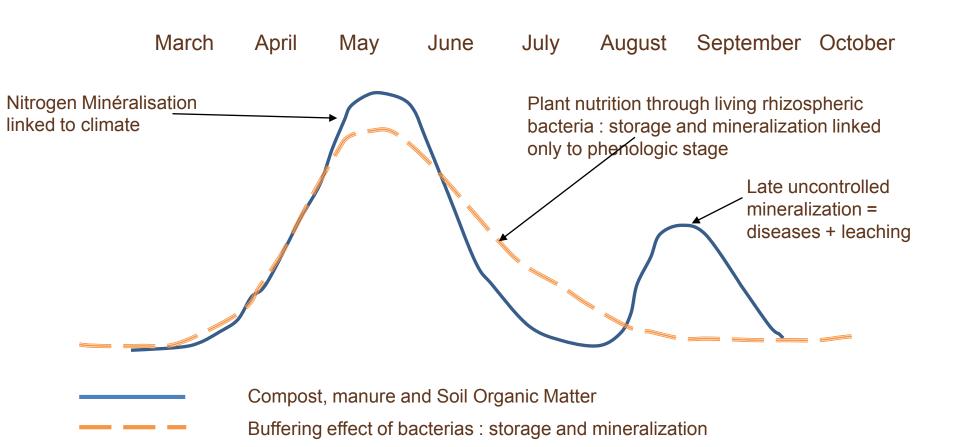
40 %

photosynthetates



HOW DOES FREE N and PK WORK ?

FREE inoculants need an active growing plant Bacterias activity is regulated by the growing stage







When and How to use FREE products ?

- When ? grapes and fruit trees : after bud bursting and new vegetation growth in spring 0.5 L/Ha
- Spraying in wet conditions
- Using a chlorine inhibitor when needed (1 Kg sugar/1000L)
- When opened, a drum must be used within 5 days and stored in a cool place
- Non open drums can be kept at room temperature (-3° to +30°)



SOIL CONDITIONER

ALASSO

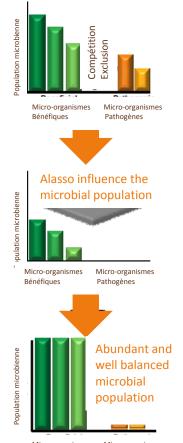
- For a better soil health...
 - Liquid product which has to be applied to the soil by spraying or irrigation at the rate of 1-2 L/Ha
 - Bring all the trace elements and organic molecules necessary for the helpful microbes of the soil
 - Relaunching of the carbon and nitrogen cycles, means better efficiency for our two other products FREE N100 and FREE MIN Optimization of mineral nitrogen inputs = reduction of the losses of nitrogen through volatilization
 - Preventive effect on soil diseases (early damping-off,.....)



Mode of action

ALASSO

Soil microbiology



Micro-organismes Bénéfiques Pathogènes



Recycled nutriment Available nutriments in the root zone Soil Organic Matter

Natural enzymatic components Degrade organic matter





The decomposition of residues supplies nutritional and other substances which are going to help in the growth of the microorganism of the soil and the plant



Example 1 : Free N100, Free PK and Alasso Monilinia problematic on Apricot tree

Protocol

Results*

- Place : Perpignan, France
- **Date** : 24/04/2014
- Variety : Big Red Apricot
- **o 3 Treatments :**
 - 1 : Control
 - 2 : FREE N100 & FREE MIN
 0,5 l/ha each + ALASSO 2
 l/ha sprayed March 2nd

	CONTROL	TREATED
Chlorophyll Index	32,27	34,40
BRIX leaves	6,10	6,10
Monilinia infested trees	55	30

*12 measurment/modality for chlorophyll,



Example 1 : Free N100, Free PK and Alasso Monilinia problematic on Apricot tree



Inter-rang 13-14

Inter-rang 14-15 Inter-

Inter-rang 15-16 Inter-rang 16-17

Pictures software treated, May 14th 2014 = vegetal cover %tage



Example 2 : Free N100 and Alasso on Apricot tree

One row sprayed on March 2014 with ALASSO (2 liters/ha) and FREE N Valence, France, picture on October 3rd 2014

Example 2 : Free N100 and Alasso on Apricot tree





ALASSO (2L/ha) + FREE N 100 sprayed on March 2014

Adjacent rows. Same variety, same age

Observation made October 3rd close to Valence, France



ALTELA and MEMCOMBA

• Altela : Natural product which stops or decrease the growth of micro-organisms on the plant

• Memcomba :

- Natural substances which induce a reaction of the plant immune system
- Plant will be then ready to act against the next pathogen attacks
- Systemic effects

Both can be used in organic farming, in accordance with Regulations (EC) No 834/2007 and No 889/2008



ALTELA + MEMCOMBA

MEMCOMBA :

ACTIVATION of some specific PLANT GENES through nutritional inputs

ALTELA :

INHIBITION of some specific PATHOGENS GENES through nutritional inputs

Production of COMPLEX MOLECULES : PROTEINS, PHYTOALEXINS, and so on..... BETTER PLANT RESISTANCE

NUTRITIONAL LINKS PLANT/PATHEOGEN NOT FAVORABLE TO PARASITS LESS VIRULENTS PATHOGENS SLOWER DEVELOPMENT and GROWTH





Results of the combined application of ALTELA and MEMCOMBA

- Reduction of use of conventional fungicides
 - Less immunosuppressive effect for the plant
 - Strong anti-fungus action
- Preventive program
- Less phenomenon of treatment resistance
- No residue
- Post harvest crop quality improvement





CONCLUSION

- Innovative, easy to use, sustainable, profitable solution
- For fruits growers
- For consumers and
- for Earth

















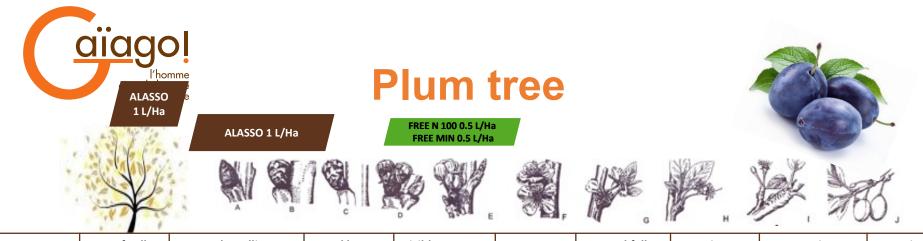
Appendix : Technical Itinerary



	Leaf Fall Autumn	Bud swelling Spring	Bud burst	Visible stamens	Open flower	Petal fall	Fruit set	Fruit development	maturit Y
Soil health - microbiology	ALASSO 1L/Ha	ALASSO 1L/Ha		FREE N 100 + FREE PK					
Fertilizaton mineral + organic									
Weeding									
Bio stimulant						STIMULUS PLF 2L/Ha after petal fall		STIMULUS PLF 2L/Ha at stage fruit 5 cm of diameter	
Elicitors		2 times SOLIFEUILLE Cuivre powder 40 Kgs/Ha before and after flowering against monilia		ALTERNATE usua and MEMCOMB		MEMCOMBA 1L/Ha ALTELA 1L/Ha	MEMCO MBA ALTELA	MEMCOMBA 1L/Ha ALTELA 1L/Ha	ALTELA 1L/Ha
Diseases									
Fungicides		Russeting : Associate usual fongicids with SOLISPE at 2Kg/Ha							
Insecticides									



	Leaf Fall Autumn	Bud swelling Spring	Bud burst	Visible stamens	Open flower	Petal fall	Fruit set	Fruit development	maturity
Soil health - microbiology	ALASSO 1L/Ha	ALASSO 1L/Ha		FREE N 100 + FREE PK					
Fertilizaton mineral + organic				ASSIMIL Ca/B		ASSIMIL Ca/B			
Weeding									
Bio stimulant						STIMULUS PLF after petals fall		STIMULUS PLF before pit hardening	
Elicitors		3 times SOLIFEUILLE Cuiv 40 Kgs/Ha before and aft against monilia	ter flowering	ALTERNATE usual fu MEMCOMBA + ALTE petals fall	-	MEMCOMBA ALTELA	MEMCOMB A ALTELA	MEMCOMBA ALTELA	ALTELA
Discuses	Bacterial canker	Bacterial canker	Monilia Aphids	monilia	monilia	Monilia	Oïdium monilia Budworm	Scab - Budworm Aphids	Rust – Budworm Anarsia
Fungicides		Associate usual fongicids with SOLISPE at 2Kg/Ha							
Insecticides									



	Leaf Fall Autumn	Bud swelling Spring	Bud burst	Visible stamens	Open flower	Petal fall	Fruit set	Fruit development	maturity
Soil health - microbiology	ALASSO 1L/Ha	ALASSO 1L/Ha		FREE N 100 + FREE PK	Liquiplex B	Liquiplex B	SOLISPE		
Fertilizaton mineral + organic									
Weeding									
Bio stimulant						STIMULUS PLF after petals fall		STIMULUS PLF avant durcis. du noyau	
Elicitors		2 times SOLIFEUILLE Cuiv 40 Kgs/Ha before or afte against monilia		ALTERNATE usual and MEMCOMBA after petals fall	-	MEMCOMBA ALTELA	MEMCOMBA ALTELA	MEMCOMBA ALTELA	ALTELA
Diseases		Bacterial canker	Monilia pucerons	monilia	Monilia carpocapses	Monilia	monilia - rust Budworms	Monilia - Budworms - Aphids	Rust
Fungicides		Associate usual fongicids with SOLISPE at 2Kg/Ha							
Insecticides									



Strawberry



Sit Sit Sit Sit		
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		Description of the second s		100 C	or the second	and the second second	STREET, STREET	Contraction of the second s	
	Tillage	plantation	Regrowth	Iniciation / Stem elongation	Flower buds emergence	First flowers	Flowering	First fruits	Full producti on
Soil health - microbiology	ALASSO 2L/Ha	ALASSO 2L/Ha	FREE N100 + FR	EE PK					
Fertilization									
Weeding									
Bio stimulant							STIMULUS PLF 2L/Ha every 15 days after flowering	STIMULS PLF	STIMULU S PLF
Elicitors							ALTELA 1L/Ha + MEMCOMBA 1L/Ha Every 15 days	ALTELA 1L/Ha + MEMCOMBA 1L/Ha Every 15 days	ALTELA 1L/Ha + MEMCO MBA
Diseases									
Fungicides									
Insecticides									