



## plantsforplants<sup>®</sup> a concept by Landlab

# Plants for Plants® Trial Result Book Year 2018-2021



531



## Proven biostimulation effects on nearly 600 ha



Your crop has a story to tell. About its needs. About its resistance against Abiotic Stress. About the best circumstances for it to prosper in.

RÐ

plantsforplants



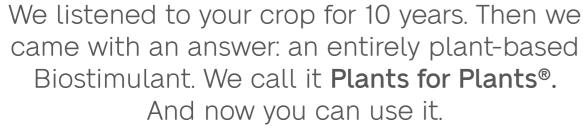
More than 120 trials 50 crops 6 climate zones

the product.



- Almost 70% of the trials showed positive meaning better quality and quantity
- control but with less input of water or nutrient
- happening in reality

Thanks to the trials, we get a better understanding of what the plants need in every circumstance, and how we can enhance the crop's performance using Plants for Plants<sup>®</sup>. Now we know exactly how to apply, what is the precise dosage for each crop, and how to position the products.





#### LIFE Plants for Plants<sup>®</sup> Project

Plants for Plants® was awarded a grant by LIFE, the EU's funding instrument for the environment and climate action. The Plants for Plants® project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

In the last 5 years, we've conducted more than 120 scientific and demonstration trials to prove the effect of the product in both stress and comfort conditions, and to let the growers experience

> We test three products with different aims: PlantsforPlants® 4-Vita foliar applied to increase Water Use Efficiency (WUE), PlantsforPlants<sup>®</sup> 4-Good foliar applied to increase Nutrient (NUE). Use Efficiency and PlantsforPlants<sup>®</sup> 4-Terra soilapplied to increase Nutrient Use Efficiency.

• 25% of the trials have shown neutral results meaning that the yield was similar to the

• Finally, 6% of the trials have shown negative impacts after the application of the products. This is explained by the heterogeneity of the plots; it is the perfect illustration of what is

#### Plants for Plants<sup>®</sup> trials

In the frame of the EU-founded LIFE Project, we've tested the Plants for Plants® prototypes using two different approaches:

 Scientific trials (B4): we've performed scientific trials in distinct climatic zones all around Europe on a large number of crops. Using this approach, we've measured the efficiency of the Plants for Plants solutions under certain conditions and in different locations.



• Demo trials (B5): thanks to the

knowledge acquired during the scientific trials, we've proved the performance of the P4P products to growers all over the world with demo trials on a selection of crops.



"We are very satisfied with Plants for Plants performance from both trials, the plants were healthy with proper growth and flowering, giving high quality fruits. Although we had some doubts about the trials because we had to reduce a lot the amount of water and phosphorus but the plants were hydrated and not stressed at all. From my experience I recommend Plant for Plants 4-Terra & 4-Vita".



"The main cultivation problem we come across in that area is that the ground water and ditch water in this area is salty, so we can't irrigate to maintain the water balance in the plant and the availability in the soil. After using Plants for Plants 4-Vita, we saw an increase in the 45/60 size grade, which resulted in 7% increase in yield, which is approximately 3 tons per hectare. I am very satisfied with the results, it made quite a difference, I would like to try in the upcoming season".



"I was really interested in the fact that Plants for Plants 4-Terra can help the plants to better uptake the phosphorus from the soil. The trials performed were really fruitful and effective, the number of melons that ripened early was impressive comparing to conventional fertilization, which resulted in early harvest and higher profit. Am sure that I will repeat the experience next season".



"I noticed a better and earlier load on the treated part with Plants for Plants 4-Terra compared to the control, despite a reduction in phosphorus fertilization. Moreover, I noticed a better caliber distribution on the sizes 2A and 3A which are best valued and less waste overall".

#### Summary

Over last years, these trials split into North (31%) and South (69%) Europe and covered vegetables (20%), winegrapes (10%), arable crops (32%), potatoes (20%), and fruit trees (20%). Below, we've prepared a compilation of the most significant trials conducted since the beginning of Plants for Plants project.

							B	02
1	CROP GROUP	PRODUCT	CROP	YEAR	EXECUTION	COUNTRY	PAGE	
	Winegrape	4-Vita	Winegrape	2018	Novi Sad	Serbia	6-7	1
$\langle \rangle$	Winegrape	4-Vita	Winegrape	2020	Grower	France	8	1
	Winegrape	4-Vita	Winegrape	2021	Grower	France	9	1
	Winegrape	4-Vita	Winegrape	2021	Grower	France	10	1
	Vegetable	4-Terra	Strawberry	2018	LandLab	Italy	12-13	1.
	Vegetable	4-Terra	Tomato	2020	LandLab	Italy	14-15	
À	Vegetable	4-Terra	Strawberry	2018	Novi Sad	Serbia	16-17	
	Vegetable	4-Terra	Eggplant	2019	LandLab	Italy	18-19	6
	Vegetable	4-Terra	Melon	2020	Grower	Italy	20	
	Vegetable	4-Terra	Tomato	2020	Grower	Italy	21	1
	Vegetable	4-Terra	Florina pepper	2021	Grower	Greece	22	QQ
	Vegetable	4-Terra	Lettuce	2021	Grower	Italy	24	$\bigcirc$
	Vegetable	4-Terra	Melon	2021	Grower	Italy	25	1
	Potato	4-Good	Potato	2020	Grower	The Netherlands	26	1
	Potato	4-Good	Potato	2020	Grower	Croatia	27	1
	Potato	4-Good	Potato	2020	Grower	Finland	28	1
	Potato	4-Good	Potato	2021	Grower	Belgium	29	1
2	Potato	4-Good	Potato	2021	Grower	Finland	30	1
	Potato	4-Vita	Potato	2021	Grower	Ireland	31	1
000	Potato	4-Vita	Potato	2018	LandLab	Italy	32-33	
_ NO	Potato	4-Vita	Potato	2020	Grower	The Netherlands	34	$ \land ( \mathcal{V} ) $
	Fruit trees	4-Terra	Apple	2019	Osjek	Croatia	36-37	
	Fruit trees	4-Terra	Apple	2020	Grower	Croatia	38	
00	Fruit trees	4-Terra	Apricot	2020	Grower	France	39	
G	Fruit trees	4-Terra	Pear	2020	Grower	The Netherlands	40	60
	Fruit trees	4-Terra	Apricot	2021	Grower	France	41	
	Fruit trees	4-Terra	Pear	2021	Grower	The Netherlands	42	Me Con
	Fruit trees	4-Vita	Apple	2018	Novi Sad	Serbia	44-45	
	Fruit trees	4-Vita	Apple	2019	Osjek	Croatia	46-47	]
	Arable crops	4-Good	Red beet	2018	LandLab	Italy	48-49	
	Arable crops	4-Good	Sugar beet	2019	Osjek	Croatia	50-51	
	Arable crops	4-Good	Sugar beet	2020	Grower	Croatia	52	
	Arable crops	4-Good	Corn	2021	Grwer	Slovakia	53	
DA	Arable crops	4-Vita	Wheat	2018	LandLab	Italy	54-55	
Ľ	Arable crops	4-Vita	Wheat	2019	LandLab	Poland	56-57	
	Arable crops	4-Vita	Corn	2020	Grower	France	58	
A	Arable crops	4-Vita	Corn	2020	Grower	Greece	59	()
	Arable crops	4-Vita	Sugar beet	2020	Grower	Finland	60	6
	Arable crops	4-Vita	Wheat	2020	Grower	Italy	61	
	Arable crops	4-Vita	Barley	2021	Grower	Finland	62	
	Arable crops	4-Vita	Canola	2021	Grower	Croatia	63	
l	Arable crops	4-Vita	Wheat	2021	Grower	Germany	64	

# 4-Vita®

#### **INCREASE IN YIELD IN COMFORT CONDITIONS**

plantsforplants<sup>•</sup>

Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:

- CROP: Winegrape
- VARIETY: Muscat Hamburg
- YEAR: 2018
- LOCATION: Vrdnik, Serbia
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Novi Sad University
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 6

**B4** 

#### **BETTER NUTRITION**



#### Control: Farmer practice

#### Treatment:

	P4P <sup>®</sup> 4-Vita
	FP + 3 applications x 3.33 L/Ha of 4-Vita
Ż	Beginning of flowering
	Two weeks after first application
	Two weeks after the second application



Vield improved by nearly 30%. Higher anthocyan in content by more than 70%. Better nutrition, slight increase in concentration of macro and microelements. With higher yield and increased coloration, 4-Vita has shown good results even in comfort situations.





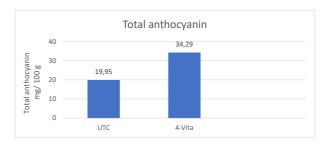
## PLANTS FOR PLANTS<sup>®</sup>

## fiii RESULTS

#### **BETTER YIELD**

	Average bunch weight (g)	Yield (kg/m²)	Brix °	Acidity (g/l)
UTC	290,3 a	1.138 a	22,1	3,20
4-Vita	376.5 b	1.478 b	22,0	3,1
LSD* (0.05)	88	0,345	0,45	0,2

#### **HIGHER ANTOCYANIN**



#### **BETTER NUTRITION**

%		
	Ν	Р
UTC	2,49	0,16
4- Vita	2,53	0,17
stdev*	0,05	0,005





			mg/kg		
K	Fe	Mn	В	Cu	Zn
1,58	126	170,6	27,3	8,7	35,29
1,6	131,3	168,7	28,5	8,82	37,33
0,03	5,08	3,432	0,99	0,47	0,851

# 4-Vita<sup>®</sup>

plantsforplants<sup>®</sup>

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner

**TRIAL SET-UP** 

#### **INCREASE OF YIELD IN WINEGRAPES** IN COMFORT HYDRIC SITUATION

• CROP: Winegrape

LOCATION: Assas, France

TREATED AREA: - Ha

APPLICATION: Foliar

EXECUTED BY: Arterris

DEMONSTRATION TRIAL: B5

VARIETY: Merlot

• YEAR: 2020

Control

P4P<sup>®</sup> 4-Vita



#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Vita®

**INCREASE OF TOTAL YIELD IN CONDITION WITH 25% LESS IRRIGATION** 



# plantsforplants<sup>®</sup>

Plants for Plants® Life Project This project is co-funded by the European Union's LIFE Programme

**TRIAL SET-UP** 

• CROP: Winegrape

- VARIETY: Syrah
- YEAR: 2021
- LOCATION: Bages, France
- TREATED AREA: 1.3 Ha
- APPLICATION: Foliar
- EXECUTED BY: Arterris
- DEMONSTRATION TRIAL: B5

**Control:** Farmer practice Treatment:

	Treated with F	P4P® 4-Vita	
	FP + 4.33 L/Ha of P4P <sup>®</sup> 4-Vita	June 2021	
Ż	FP + 4.33 L/Ha of P4P® 4-Vita	Beg of July 2021	
	FP + 4.33 L/Ha of P4P® 4-Vita	End of July 2021	

e have calculated an increase of +38% in total yield in a situation with -25% less irrigation, which shows that P4P<sup>®</sup> 4-Vita made an outstanding impact on the WUE of the crop. Samples for quality assessment have been taken.

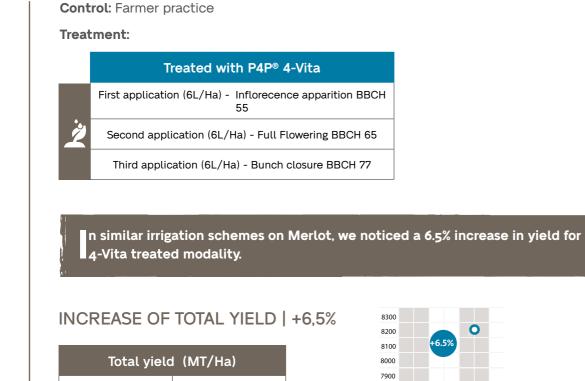
#### OUTSTANDING INCREASE OF TOTAL YIELD | +38%

Total yield	i (MT/Ha)
Control	3.97
P4P <sup>®</sup> 4-Vita	6.578

CONCLUSION













Van Iperen International B.V. | tel. +31 1 86 57 88 88 | info@iperen.com | www.vaniperen.com

O Control

Treated

7800

7700 0

7600 7500 7400







under Grant Agreement LIFE18 ENV/NL/000043. Project partner

7.738

8.250







TRIAL RESULTS B5

# 4-Vita®

#### INCREASE OF TOTAL YIELD IN SEMI-IRRIGATED CONDITIONS



Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Cinsaut
- YEAR: 2021
- LOCATION: Assas, France
- TREATED AREA: 0.7 Ha
- APPLICATION: Foliar
- EXECUTED BY: Arterris
- DEMONSTRATION TRIAL: B5





**Control:** Farmer practice

#### Treatment:

	Treated with I	P4P® 4-Vita
	FP + 4.33 L/Ha of P4P® 4-Vita	Beg of July 2021
Ż	FP + 4.33 L/Ha of P4P® 4-Vita	End of July 2021
	FP + 4.33 L/Ha of P4P® 4-Vita	August 2021



here was relatively very low hydric stress conditions and crop was not irrigated as opposed to other years in same plot.

Apparently, 4-Vita gave more than clear effect on plant performance. The result was +32% increase in total yield.



VAN IPEREN LET'S MAKE THE GREEN SWITCH

#### HIGH INCREASE OF TOTAL YILED | +32%

Total yield (MT/Ha)	
Control	9.64
P4P <sup>®</sup> 4-Vita	12.8



# 4-Terra®

**BETTER YIELD AND QUALITY WITH 40%** PHOSPHATE REDUCTION





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:





- YEAR: 2020
- LOCATION: Quinto Vicentino, Italy
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Landlab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 12

**B4** 



#### Control: Farmer practice

#### Treatment:





PEREN

LET'S MAKE THE GREEN SWITCH

VAP

With 40% P reduction, P4P®4-Terra showed +41% increase in yield in -40% P control, and +32% increasecompared with 100% P control. This clearly puts forward an increased NUE as plants performed better with reduced P.





## fiii RESULTS

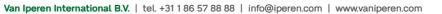
#### IMPROVED FRUIT QUALITY AND YIELD

Treatment	Total fruits numbers per plant	Total weight harvested (g)	Total green biomass (g)
100% P	24.5 a	149.88 a	285.27 a
60% P	16.5 a	140.12 a	252.99 a
60% P + 4-Terra	21.25 a	197.96 a	311.57 b











# 4-Terra®

NUTRIENT USE EFFICIENCY IN COMFORT SITUATION

plantsforplants<sup>®</sup>

Plants for Plants® Life Project This project is co-funded by the European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:



- VARIETY: Stratos
- YEAR: 2018
- LOCATION: Quinto Vicentino, Italy
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Landlab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 14

**B4** 



#### Control: Farmer practice

Treatment:





his trial has proven that by applying 4-Terra in conditions where full agrotechnics were applied, we got fruits +20% weight. We can say that 4-Terra has had a positive effect on better phosphorus uptake and utilization by crop.





### PLANTS FOR PLANTS<sup>®</sup>



#### **BETTER FRUIT WEIGHT**

Treatment	Total fruit weight (g)	Total N fruits/plant
NPK	83.99 a	7a
4-Terra, NPK	100.68 b	7a





TRIAL RESULTS PAGE 15



# 4-Terra®

plantsforplants<sup>®</sup>

Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:

**TESTED NUTRIENT USE EFFICIENCY** IN COMFORT SITUATION



- VARIETY: Joly
- YEAR: 2019
- LOCATION: Rumenka, Serbia
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Agriculture Faculty, Novi Sad
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 16

**B4** 



## Control: Farmer practice

Treatment:

	P4P <sup>®</sup> 4-Terra
	FP + 3 applications of 11 l/16,5 kg/ha and 44,2 kg/ha of 4-Terra in total (split on 3 apps)
2	Beginning of flowering
0	1 week after the first application
	1 week after the last application



> 12% Yield improvement comparing two doses of 4-Terra. This shows that we have a wide range of response on dose (between 16.5-44.2 Kg/Ha). Increase in anthocyanin content. Improvement of P availability in soil.



## PLANTS FOR PLANTS<sup>®</sup>



#### IMPROVED FRUIT QUALITY AND YIELD

	Yields (g/plot)		Brix°		Antocyanin (mg/100g)	
Control	2522,6		8,81		19,51	
4-Terra 16,5	2826,6	12,1%	8,87	0,6%	19,95	2,3 %
4-Terra 47,2	3022,5	19,8%	9,15	3,8%	20,13	3,2 %

P availability (mg P2O5 /100 mg of soil)							
Before planting At the end of picking							
Control	18,85	14,55					
4-Terra 16,5	18,85	15,00	13,1%				
4-Terra 47,2	18,85	16,42	12,9%				
LSD (0,05)		1,6					











**R4** 

## TRIAL RESULTS PAGE 18

#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Terra<sup>®</sup>/4-Good<sup>®</sup>

BETTER NUE AND IMPROVED YIELD





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: -
- YEAR: 2018/2019
- LOCATION: LandLab R&D Center, Italy
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: LandLab
- DEMONSTRATION TRIAL: B4



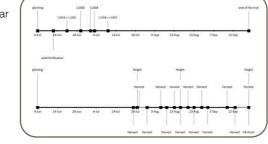
#### Control: Farmer practice

#### Treatment:

	Control 100% P	Control -30% P	P4P <sup>®</sup> 4-Terra -30% P	P4P® 4-Terra + 4-Good -30% P
Ż	2x applications	2x applications	2x applications: 1st app. 22 days after planting.The 2nd app. is done 8 days after	2x applications: 1st app. 15 days after planting.The 2nd app. is done 10 days after

#### Fertilization management:

4-Good dosis applied via foliar





he fruit yield in terms of weight of the positive control (100% P) was similar to the negative control (70%). But The two treatments with reduced amount of P, 4-Terra via fertigation as well as 4-Terra via Fertigation + 4-Good via Foliar application performed much better than the 2 controls. A yield increase of 5 to 12% depending on the treatment.





#### BETTER NUE AND IMPROVED TIELD

#### INCREASED YIELD

	Number of fruits									
	23.07	30.07	06.08	13.08	20.08	27.08	09.09	13.09	20.09	
Control 100% P	1282.1 a	5769.2 b	14102.6 ab	29487.2 a	55128.2 a	79487.2 a	113461.5 a	124359 a	131410.3 a	
Control -30% P	1923.1 a	3846.2 ab	12500 ab	24038.5 a	45192.3 a	75961.5 a	111538.5 a	118269.2 a	125961.5 a	
4-Terra -30% P	0.0 a	961.5 ab	4807.7 ab	23076.9 a	51923.1 a	73076.9 a	123076.9 a	135576.9 a	144230.8 a	
4-Terra + 4-Good -30% P	0.0 a	3846.2 ab	14615.4 b	34615.4 a	65384.6 a	91538.5 a	134615.4 a	147692.3 a	152307.7 a	

	23.07	30.07	06.08	13.08	20.08	27.08	09.09	13.09	20.09
Control 100% P	0.5 ab	2.1 b	4.9 ab	9.5 a	17.3 a	24 a	35.5 a	38.4 a	40.4 a
Control -30% P	0.9 b	1.5 ab	4.2 ab	7.7 a	14.4 a	23.5 a	36.5 a	38.6 a	40.8 a
4-Terra -30% P	0.0 a	0.3 ab	1.5 ab	7.2 a	16 a	22.1 a	37.4 a	40.6 a	42.9 a
4-Terra + 4-Good -30% P	0.0 a	0.8 ab	5.2 b	11.5 a	20.4 a	28 a	41.2 a	44.4 a	45.6 a

Although plants were in comfortable conditions, the use of 4-Terra increased the yield of the eggplants, and this trend was improved further by the combination of 4-Terra soil-applied and 4-Good foliar applied. These two products may, therefore, have a positive synergistic effect on plants.

#### EFFECT ON PUE (PHOSPHATE USE **EFFICIENCY**):

Phosphorus Use Efficiency (PUE, kg/ m3) was calculated as the ratio of yield and P2O5 applied. Figure shows that the highest amount of phosphorus lead to a significant lower PUE (UTC, 100%), while plants treated with 4-Terra at the higher dosage and 4-Terra+4-Good showed the best PUE.

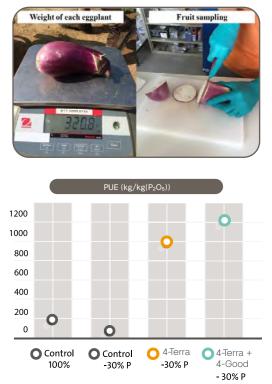
This could be explained by the fact that plants are naturally able to cope with a little P deficiency by putting in place mechanisms to exploit better the P available. The application of the product probably further improves these mechanisms, or induce other responses linked to a better exploitation of the P.







#### lative weight of frui



# 4-Terra®

#### **INCREASE OF TOTAL YIELD** WITH 25% LESS P205/HA





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- YEAR: 2020
- LOCATION: Italy
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Terre Emerse
- DEMONSTRATION TRIAL: B5

250

200

O 150

26.07.2020

27.07.2020

O Contr

29.07.2020

30.07.2020

0



TRIAL RESULTS PAGE 20

**B5** 



PLANTS FOR PLANTS<sup>®</sup>

# 4-Terra®

**INCREASE OF TOTAL YIELD** WITH NO ALTERATION OF QUALITY



# plantsforplants



Plants for Plants® Life Project This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

> Project partner

**TRIAL SET-UP** 

CROP: Industrial tomato

- VARIETY: Tumatica
- YEAR: 2020
- LOCATION: Italy
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Terre Emerse
- DEMONSTRATION TRIAL: B5

**Control:** Farmer practice

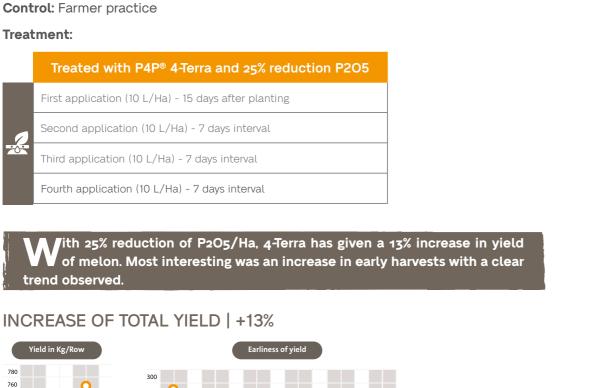
Treatment:

1

Control

P4P<sup>®</sup> 4-Terra









RESULTS

740

720

700

0 660

O Control

O Treated



#### Van Iperen International B.V. | tel. +31 1 86 57 88 88 | info@iperen.com | www.vaniperen.com

01.08.2020 07.08.2020

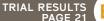
Brix



fiii RESULTS











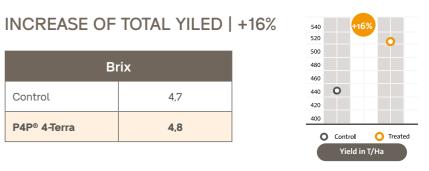
#### Treated with P4P<sup>®</sup> 4-Terra

First application (13.33 L/Ha) - 15 days after planting

Second application (13.33 L/Ha) - 7 days interval

Third application (13.33 L/Ha) - 7 days interval

n industrial tomato, we saw a 16% increase in total yield with 4-Terra compared to control. Interesting fact was that the increase is almost the same in terms of quality categories with the same breakdown in both modalities (88% red tomatoes, 7% green tomatoes and 5% waste). No significant impact was noted on Brix. This shows that 4-Terra had a major yield impact.



TRIAL RESULTS PAGE 22 B5

# 4-Terra®

NUTRIENT USE EFFICIENCY IN - 30% P2O5 SITUATION





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Florina
- YEAR: 2021
- LOCATION: Avlonas, Athens Province
- TREATED AREA: 1 Ha
- APPLICATION: Fertigation
- EXECUTED BY: AGK
- DEMONSTRATION TRIAL: B5



**Control:** Farmer practice (full dose P2O5 = 366 Kg P2O5/Ha) Treatment:





Treated with P4P<sup>®</sup> 4-Terra



প্রিপি CONCLUSION



## noticed on this highly valued pepper variety in Greece especially today with the high prices of P fertilizers.

he yield was +10% higher with 30% less P2O5. A huge economical impact was

#### INCREASE OF TOTAL YIELD | +10%

Total yield (	MT/Ha)
Control	100
P4P® 4-Terra with 30% less P2O5 applied	110





# 4-Terra®

plantsforplants<sup>®</sup>

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner

**INCREASE OF TOTAL YIELD IN** SIMILAR P-CONDITIONS



#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Terra®

**INCREASE OF TOTAL YIELD IN COMFORT CONDITIONS** 







under Grant Agreement LIFE18 ENV/NL/000043.

**TRIAL SET-UP** 

CROP: Melon

- VARIETY: -
- YEAR: 2021
- LOCATION: Sermide, Italy
- TREATED AREA: 1 Ha
- APPLICATION: Fertigation
- EXECUTED BY: Terremerse
- DEMONSTRATION TRIAL: B5



Treat	ment:
	Treated with P4P <sup>®</sup> 4-Terra
	FP + 16.7 L/Ha of P4P <sup>®</sup> 4-Terra
2	FP + 16.7 L/Ha of P4P <sup>®</sup> 4-Terra
	FP + 16.7 L/Ha of P4P <sup>®</sup> 4-Terra

CROP: Lettuce

LOCATION: Sermide, Italy

APPLICATION: Fertigation

• EXECUTED BY: Terremerse

DEMONSTRATION TRIAL: B5

Control: Farmer practice

• TREATED AREA: 1 Ha

• VARIETY:

• YEAR: 2021





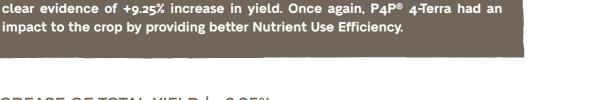
MAKE THE GREEN SWITCH

# impact to the crop by providing better Nutrient Use Efficiency.

n a commercial trial plot, P4P<sup>®</sup> 4-Terra was applied in the same conditions Oas the plot with the regular farmer practice. Plants reacted very well, with

#### INCREASE OF TOTAL YIELD | +9.25%

Total yield (MT/Ha)				
Control	28.1			
P4P <sup>®</sup> 4-Terra	30.7			



CONCLUSION

FAT RESULTS

Project partner

Control: Farmer practice Treatment:

Treated with P4P <sup>®</sup> 4-Terra						
FP + 16.7 L/Ha of P4P® 4-Terra	April 2021					
 FP + 16.7 L/Ha of P4P® 4-Terra	Mid of May 2021					
FP + 16.7 L/Ha of P4P® 4-Terra	End of May 2021					

treated with P4P<sup>®</sup> 4-Terra. more competitive market prices.

#### EARLIER HARVEST and INCREASE OF TOTAL YIELD | +14.4%

Total yield (MT/Ha)			
Control	25		
P4P <sup>®</sup> 4-Terra	28.6		







n comfort, irrigated conditions, a 14.4% increase in yield was found on the plot

For the second year in a row grower is satisfied, because, besides that effect, he also had an earlier harvest on the treated plot which resulted in obtaining



# 4-Good<sup>®</sup>

**INCREASE OF YIELD IN DESIRED CALIBERS** 



TRIAL RESULTS

**B5** 

# plantsforplants<sup>®</sup>



Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: -
- YEAR: 2020
- LOCATION: Zeerijp, The Netherlands
- TREATED AREA: Ha
- APPLICATION: Foliar

Control: Farmer practice

Treatment:

- EXECUTED BY: Van Iperen B.V.
- DEMONSTRATION TRIAL: B5







### PLANTS FOR PLANTS<sup>®</sup>

# 4-Good<sup>®</sup>

plantsforplants

Plants for Plants® Life Project This project is co-funded by the

European Union's LIFE Programme

**TRIAL SET-UP** 

CONCLUSION

FAT

RESULTS

CONSERVATION OF YIELD **DESPITE P2O5 REDUCTION** 



- CROP: Potato
- VARIETY: Bellarosa
- YEAR: 2020
- LOCATION: Cerna, Croatia
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Horticentar
- DEMONSTRATION TRIAL: B5











MAKE THE GREEN SWITCH

#### INCREASE OF TOTAL YIELD | +19%

Second application (6L/Ha) - 15 days later

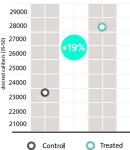
Third application (6L/Ha) - 15 days later

Treated with P4P<sup>®</sup> 4-Good and 50% reduction P2O5

First application (6L/Ha) - 2 weeks after start of regrowth after ridging

ith 50% less P2O5 applied, the 4-Good treated plot shows increased desired caliber yields compared to full P2O5 non treated modality. This

reflects better economics for the growers as desired calibers (35-50 mm) are



selling to higher prices.





Control: Farmer practice

Second application (9L/Ha) - 15 days later

e had same yield even with 30% less P2O5. 4-Good product gives surely A better plant performance with less P2O5 applied. This clearly shows an enhanced nutrient use efficicency with plants treated with 4-Good.

# HECATER

35000				
30000	2		0	
25000			Ĭ	
20000				
15000				
10000				
5000				
0				
<b>O</b> Co	ontrol	Q	Trea	:05









#### Treated with P4P<sup>®</sup> 4-Good and 30% reduction P2O5

First application (9L/Ha) - two weeks after start of regrowth after ridging

#### YIELD CONSERVATION DESPITE 30% REDUCTION OF P2O5 UNITS PER

# 4-Good®

plantsforplants<sup>®</sup>

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner

**INCREASE OF TOTAL YIELD AND** STARCH WITH 30% LESS P2O5



#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Good<sup>®</sup>

plantsforplants<sup>®</sup>

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner

**TRIAL SET-UP** 

MUCH LESS SCAB AND BETTER NUE IN COMFORT CONDITIONS



### CROP: Potato

- VARIETY: Bintie
- YEAR: 2021

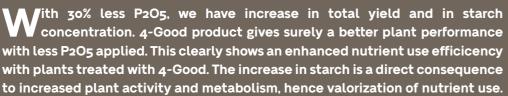
Treatment:

- LOCATION: Herderen, Belgium
- TREATED AREA: 1 Ha
- EXECUTED BY: Arvesta
- APPLICATION: Foliar
- DEMONSTRATION TRIAL: B5











Fii

RESULTS

A le have confirmed increase of 11,57% of the total yield, comparing to the conventional farmers practice. Also, we have observed significantly less scab in the treated potato.

#### INCREASE OF TOTAL YIELD | +7,03 MT/ha

Total yield	d (MT/ha)
Farmer practice	60.73
P4P <sup>®</sup> 4-Good	67.76



Cont	rol: Farmer practice
Treat	tment:
	Treated with P4P <sup>®</sup> 4-Good and 30% reduction P2O5

First application (9L/Ha) - 2 weeks after start of regrowth after ridging

Second application (9L/Ha) - 15 days later

CROP: Potato starch

TREATED AREA: - Ha

APPLICATION: Foliar

LOCATION: Kokemäki, Finland

EXECUTED BY: Kekkila-Vapo

DEMONSTRATION TRIAL: B5

• VARIETY: -

• YEAR: 2020

56000

54000

52000

50000

48000 46000

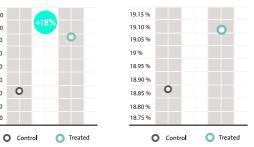
42000

0 44000

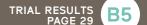
fii RESULTS



#### INCREASE OF TOTAL YIELD | +18%



#### Van Iperen International B.V. | tel. +31 1 86 57 88 88 | info@iperen.com | www.vaniperen.com





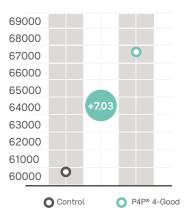




**Control:** Farmer practice (FP)

Treated with P4P <sup>®</sup> 4-Good			
FP + 4.33 L/Ha of P4P® 4-Good	6 weeks after regrowth from ridging		
FP + 4.33 L/Ha of P4P <sup>®</sup> 4-Good	25 June 2021		
FP + 4.33 L/Ha of P4P <sup>®</sup> 4-Good	14 July 2021		





# 4-Good<sup>®</sup>

#### **INCREASE OF TOTAL YIELD AND STARCH IN 30% LESS P-CONDITIONS**



Plants for Plants® Life Project This project is co-funded by the

European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- LOCATION: Kokemäki, Finland
- TREATED AREA: 5 Ha
- EXECUTED BY: Kekkila, Vapo
- APPLICATION: Foliar
- DEMONSTRATION TRIAL: B5

**Control:** Farmer practice (FP)



TRIAL RESULTS

**B5** 





PLANTS FOR PLANTS<sup>®</sup>

**REMARKABLY LESS SCAB IN** 

4-Good<sup>®</sup>

-25% P-CONDITIONS

## plantsforplants<sup>®</sup>





Project partner 

**TRIAL SET-UP** 

CROP: Potato

- VARIETY: Rooster
- YEAR: 2021

Treatment:

- LOCATION: Ardee, Ireland
- TREATED AREA: 1 Ha
- EXECUTED BY: John NAD Carroll
- APPLICATION: Foliar
- DEMONSTRATION TRIAL: B5











## INCREASE OF TOTAL YIELD | +1.2 MT/Ha and STARCH 211 Kg/Ha

Total yield (in MT/Ha)		Total yield of starch
Farmer practice	41	7216
P4P <sup>®</sup> 4-Good	42,2	7427





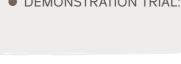
n condition with 25% less used Phosphate, the total yield of the treated plot was -5.7% lower comparing to the control. On the other hand, there was extremely less scab observed for treated. Grower was very satisfied as marketable yield was better for P4P, although not measured.

## REMARKABLY LESS SCAB

Total yield (MT/ha)	
Farmer practice (FP)	53,1
P4P <sup>®</sup> 4-Good	50,1







Treatment:				
	Treated wit	h P4P <sup>®</sup> 4-Good		
	FP -30%P + 6.5 L/Ha of P4P® 4-Good	6 weeks after regrowth of ridging		
	FP -30%P + 6.5 L/Ha of P4P® 4-Good			





n conditions of 30% less applied phosphate we have determined +2.92% increasement of total yield, as well as + 3% increase in starch yield.





Control: Farmers practice (FP): 750 Kg/Ha SOP | 250Kg/Ha PolyS | 500 Kg/Ha DAP

Treated with P4P <sup>®</sup> 4-Good		
FP with 25% less DAP + 4.33 L/Ha of P4P® 4-Good	2 - weeks after emergence	
FP with 25% less DAP + 4.33 L/Ha of P4P® 4-Good	13 July 2021	
FP with 25% less DAP + 4.33 L/Ha of P4P® 4-Good	27 July 2021	

19 15



Control

P4P® 4-Good



**TESTED WATER USE EFFICIENCY** IN CONDITIONS WITH **30% WATER REDUCTION** 



- VARIETY: Liliana
- YEAR: 2018
- LOCATION: Quinto Vicentino, Italy
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: LandLab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 32

**B4** 

# **TRIAL SET-UP**

Plants for Plants® Life Project This project is co-funded by the

European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:

Control: Farmer practice Treatment:

P4P<sup>®</sup> 4-Vita - 30% water recution + 3 applications x 5 l/ha

Two weeks before tuber setting

Two weeks after the first application

Two before after the second application



he total weight improved by 23% compared with 70% Water control. The weight of large tubers (>50 mm) was increased by 55%. With -30% water, the total weight of the treated potato was statistically comparable with the 100% control. This means 4-Vita managed to compensate the 30% reduction of water and to level up with 100% water control! On the other hand, the 70% water control showed a statistically significant -18.2% decrease in yield compared with the 100% water control.

Van Iperen International B.V. | tel. +31 1 86 57 88 88 | info@iperen.com | www.vaniperen.com





#### PLANTS FOR PLANTS<sup>®</sup>



#### **TUBERS WEIGHT IN DIFFERENT SIZES**

Treatment	Weight (g) 50-60 mm	Weight (g) >60mm	Total weight (g) >50 mm
Water 100%	2426.2 a	887.4 a	3333,6
Water 70%	1644.3 b	270.6 b	1914,9
Water 70%, 4-Vita	2210 ab	754.9 a	2964,9

#### TOTAL YIELD

Treatment	Total weight (g)
Water 100%	5295 a
Water 70%	4331.8 b
Water 70%, 4-Vita	5309.2 a





#### **PLANTS FOR PLANTS®**

# 4-Vita®

#### INCREASE OF TOTAL YIELD IN NON-IRRIGATED CONDITIONS



\*\_\_\_\_\_\* \*\_\_\_\_\_\*

Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Innovator
- YEAR: 2020
- LOCATION: Padhoek, The Netherlands
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Van Iperen B.V.
- DEMONSTRATION TRIAL: B5





#### Treatment:

#### Treated with P4P<sup>®</sup> 4-Vita

- First application (6L/Ha) 2 weeks after start of regrowth after ridging
- Second application (6L/Ha) 15 days later
- Third application (6L/Ha) 15 days later

Application: - Ramdomized blocks. - 4 reps of 1.5 linear meter per item.

In non-irrigated conditions, we saw a 6.7% increase in total yield, and an increase in desired yield calibers, and fewer undesirables. This shows that P4P 4-Vita affected plant performance, especially that we were in non-irrigated conditions for both modalities.



প্রিধি

CONCLUSION

#### INCREASE OF TOTAL YIELD | +6,7%

# Total Yield in Kg/Ha 52000 51000 50000 6,7% 49000 48000 47000 46000

#### INCRAESE IN DESIRED CALIBER YIELD

Yield (in Kg/Ha) per Category		
Desired calibers (> 45 mm)	Undesirables (<45 mm)	
45,761.67	2,200	
50,423.33	973.33	
	Desired calibers (> 45 mm) 45,761.67	



TRIAL RESULTS B5



# 4-Terra®

#### **BETTER ABILITY** TO ASSIMILATE NUTRIENTS



# plantsforplants<sup>®</sup>



Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Gala
- YEAR: 2018/2019
- LOCATION: Osijek, Croatia
- APPLICATION: Fertigation Soil Application
- EXECUTED BY: University Croatia / LandLab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS

# **TRIAL SET-UP**

## Control: Farmer practice

Treatment:

 Control 100% P	Control 70% P	4-Terra D1 70% P	4-Terra D2 70% P
3x applications after	3x applications after	3x applications after	3x applications after
buds burst till full	buds burst till full	buds burst till full	buds burst till full
 flowering (1 per week)	flowering (1 per week)	flowering (1 per week)	flowering (1 per week)

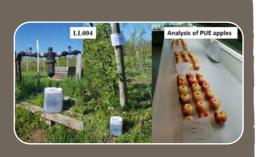
#### Fertigation management:

- 30% P reduction (compared to farmer practice) in fertigation taking into account base dressing, where P reduction is applied.



MAKE THE GREEN SWITCH

We can observe Higher P availability in soil solution. Thanks to a better plant nutrition a positive effect on yield is noted. In addition to that, we can verify a strong positive effect on quality traits of the apple, better firmness and in particular, 4-Terra induce a huge effect on coloration, which is a key quality factor in red apples varieties such as Gala.

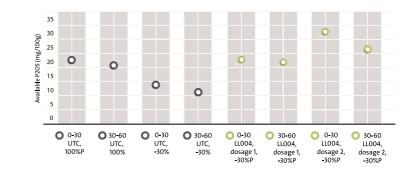






#### **INCREASED EFFICIENCY OF NUTRITION**

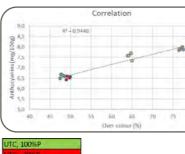
BETTER P AVAILABILITY: Very clear results showing a better P availability in soil solution at the end of the trial. Logically, available P with 100% P fertilization is higher than with 30% less for the control, but all 4-Terra treatments (with 30% less P) showed an available P in soil at least similar to Control 100% P.



BETTER QUALITY: On coloration, 4-Terra treatments dramatically and very significantly increased over color and anthocyanins.

	Firmness	Over colour	Anthocyanins
UTC 100%P	7,06 a	48 a	6,6 a
UTC -30%P	7,26 a	49,5 a	6,52 a
4-Terra, dosage 1, -30%P	7,95 d	64,5 c	7,53 b
4-Terra, dosage 2, -30%P	7,69 c	77 d	7,89 с

APPLE COLORATION: Clear correlation between anthocyanins content and apple coloration. 4-Terra greatly improved the Gala's coloration.









BETTER YIELD: Increase on efficiency for all 4-Terra applications.

Fruit weight (g)			
UTC 100%P	193,57 a		
UTC -30%P	193,57 a		
4-Terra, dosage 1, -30%P	195,11 a		
4-Terra, dosage 2, -30%P	195,28 a		

# 4-Terra<sup>®</sup>

#### CONSERVATION OF YIELD AND **QUALITY IMPROVEMENT DESPITE P205**



Plants for Plants® Life Project This project is co-funded by the European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043. Project partne





- VARIETY: Braeburn
- YEAR: 2020
- LOCATION: Čukovec, Croatia
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Horticentar
- DEMONSTRATION TRIAL: B5



TRIAL RESULTS





This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

plantsforplants

LANDLAB

**TRIAL SET-UP** 

CONCLUSION

RESULTS

Proiect partne

CROP: Apricot

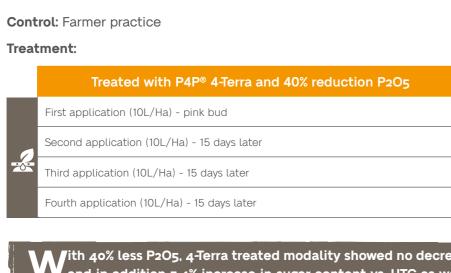
- VARIETY: Ninja
- YEAR: 2020
- LOCATION: Rivesaltes, France
- TREATED AREA: 1 Ha
- APPLICATION: Fertigation
- EXECUTED BY: Arterris

Control: Farmer practice

Treatment:

DEMONSTRATION TRIAL: B5





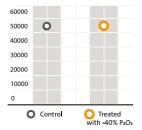






#### ith 40% less P2O5, 4-Terra treated modality showed no decrease in yield, V and in addition 5.4% increase in sugar content vs. UTC as well as bigger fruits with 8.7% higher fruit weight. The number of fruits was smaller but of higher quality.

#### YIELD CONSERVATION DESPITE -40% P2O5 UNITS PER HECTARE





# LET'S MAKE THE GREEN SWITCH







## PLANTS FOR PLANTS<sup>®</sup>

# 4-Terra®

**INCREASE OF TOTAL YIELD AND DESIRED** CALIBERS WITH -30% OF P2O5 UNITS







#### Treated with P4P<sup>®</sup> 4-Terra and 30% reduction P2O5

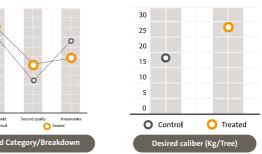
25-02-2020: 1st application (13.33 L/ha) - Pink bud

12-03-2020: 2nd application (13.33 L/ha) - Full Flowering

7-04-2020 (1 week late due to Covid): 3rd application (13.33 L/ha) - Fruit set

th 30% less P2O5, thanks to 4-Terra we have +41.3% average yield per tree out of which 46% fall in desired yield calibers category compared to 41% for control with full P2O5 dose. This has a considerable impact on grower's financials with reduced fertilizer costs but also higher selling prices as yield falling in desired categories is more important. Another important trend is the reduction of waste and category 2 indesirables.

#### INCREASE OF TOTAL YIELD | +41,3%



# 4-Terra®

plantsforplants

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partne

LANDLAB

#### **INCREASE OF TOTAL YIELD** WITH 30% LESS P2O5REDUCTION



- VARIETY: Conference
- YEAR: 2020
- LOCATION: Roosendaal, The Netherlands
- TREATED AREA: Ha
- APPLICATION: Fertigation
- EXECUTED BY: Van Iperen B.V.
- DEMONSTRATION TRIAL: B5

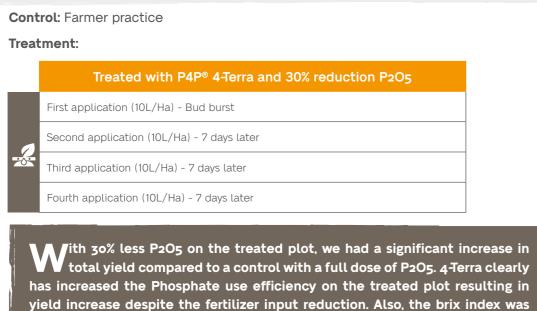
















0	Brix	
+24%	Control	12.08 a
+24%	Treated with 4-Terra and -30% P2O5	12.88 b

significantly higher. No difference in firmness was noted.

O Control Treated

1000

800 600

400 200 0



TRIAL RESULTS

35







**TRIAL SET-UP** 

Plants for Plants® Life Project









- VARIETY: Ninja
- YEAR: 2021
- LOCATION: Rivesaltes, France
- TREATED AREA: 0.3 Ha
- APPLICATION: Fertigation
- EXECUTED BY: Arterris
- DEMONSTRATION TRIAL:

# **Control:** Farmer practice Treatment:

	Treated with P4P <sup>®</sup> 4-Terra		
	FP + 16.7 L/Ha of P4P® 4-Terra	February 2021 at stage of pink bud	
<u></u>	FP + 16.7 L/Ha of P4P® 4-Terra	Beg of March 2021	
	FP + 16.7 L/Ha of P4P® 4-Terra	End of March 2021	

his season, with similar conditions in terms of agro-technical practice, P4P continues to show a double effect: We calculated a + 12% increase from total yield as well as an increase of 11% of the desired calibers. As this is the second year on the same plot, we also took the combined results from 2020 and 2021, resulting in a 26% increase in total yield and 36% increase on the desired calibers.

#### IN TWO YEARS INCREASE OF TOTAL YIELD | +26% and DESIRED CALIBERS |+36%

Combined averages over 2 years	Kg/tree	Desired calibers (2A/3A) per tree (Kg/tree)
Control (FP)	85.5	30.6
P4P <sup>®</sup> 4-Terra	108.1	41.6
Increase	26%	36%



## PLANTS FOR PLANTS<sup>®</sup>

# 4-Terra®

**INCREASE OF TOTAL YIELD AND DESIRED** CALIBRES IN SIMILAR CONDITIONS









	-
н	5
ப	0

TRIAL RESULTS B5

# 4-Terra®

INCREASE OF TOTAL YIELD IN **COMFORT CONDITIONS** 



Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Conference
- YEAR: 2021
- LOCATION: Wouw, The Netherlands
- TREATED AREA: 0.015 Ha
- APPLICATION: Fertigation
- EXECUTED BY: Van Iperen B.V.
- DEMONSTRATION TRIAL: B5







## **Control:** Farmer practice

#### Treatment:

	Treated with P4	P® 4-Terra
	FP + 16.7 L/Ha of P4P® 4-Terra	20 April 2021
<u>.</u>	FP + 16.7 L/Ha of P4P® 4-Terra	30 April 2021
	FP + 16.7 L/Ha of P4P® 4-Terra	10 May 2021





#### he plot was treated in similar, irrigated conditions and we noticed +16.36% increase in total yield. Even in situations without water stress, plants showed good reactions to P4P<sup>®</sup> 4-Terra.

#### INCREASE OF TOTAL YIELD | +16.36%

Total yield (kg/row)		
Control	1100	
P4P <sup>®</sup> 4-Terra	1280	





#### **PLANTS FOR PLANTS®**

# 4-Vita®

plantsforplants<sup>•</sup>

Plants for Plants® Life Project This project is co-funded by the

European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:

#### INCREASE YIELD AND QUALITY IN COMFORT CONDITIONS



- VARIETY: Gala and Fuji
- YEAR: 2018
- LOCATION: Mala Remeta, Serbia
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Novi Sad University
- DEMONSTRATION TRIAL: B4





## Control: Farmer practice

Treatment:

	P4P <sup>®</sup> 4-Vita - 3 applications x 3.33 L/Ha			
	GALA	FUJI		
	1x The fruits are half of size	1x The fruits are half of size		
1x Two weeks after the first application		1x Two weeks after the first application		
	1x The first fruits started to change color	1x The first fruits started to change color		



Yield improved by nearly 10%. Better coloration thanks to higher anthocyanin content by more than 50%. Better nutrition as slight increase in concentration of macro and microelements. To have same trend on two varieties shows a certain coherence with the claims of 4-Vita. Both yield and quality are increased even in comfort situations.



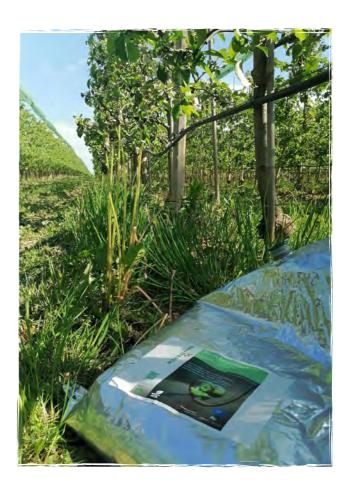


#### BETTER COLOR COVERAGE AND HIGHER ANTOCYANIN

100	Gala Color	coverage (%)
100		
80		66,4
60	54,6	
40		
	UTC	4-Vita

### BETTER YIELD

Variety	Treatment	Weight (g)	Height (mm)	Width (mm)	Yield (kg/tree)
	UTC	121,4 a	59 a	63,32 a	10,8 a
Gala	4-Vita	131,8 a	61,3 a	64,78 a	12.05 a
	LSD (0.05)	11.46	2,02	2,18	1,61
	Control	148,38 a	59,10 a	69,97 a	18,08 a
Fuji	4-Vita	152,69 a	59,58 a	71,15 a	19,58 a
	LSD (0.05)	33,5	5,57 a	5,39	4,47



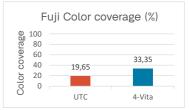
TRIAL RESULTS PAGE 44

**B4** 

RESULTS

PLANTS FOR PLANTS<sup>®</sup>





# 4-Vita®

**BETTER RESISTANCE OF THE CROP TO** WATER STRESS AND IMPROVEMENT OF **QUALITATIVE CRITERIA** 



Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Gala
- YEAR: 2018/2019
- LOCATION: Osijek, Croatia
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: University Croatia / LandLab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS

**B4** 

# TRIAL SET-UP

#### **Treatment:**

	Control 100%	Control 70%	P4P <sup>®</sup> 4-Vita 100%	P4P <sup>®</sup> 4-Vita 70%
	irrigation	irrigation	irrigation	irrigation
Ż	2x applications with interval of 10 days			

Irrigation management:

- Farmer practice till the second product application

- After the second application, reduction of 30% (rain events included).



n both treated modalities, we observed a significant increase of fruit size, specifically on fruit weight. The second major positive effect is observed on quality traits notably on color coverage, where treated apples showed much higher coloration. P4P 4-Vita treatment increased color-related parameters (over color andanthocyanins). However, no effect was detected on number of fruits.





## fîf RESULTS

#### IMPROVED YIELD AND FRUIT QUALITY

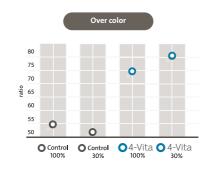
POSITIVE EFFECTS ON YIELD (FRUIT WEIGHT): Only one harvest was performed, therefore, as the treatments could not have had an impact on final yield in terms of number of apples, the average size and weight of the single fruits were measured. The difference observed was less than 1% in weight. Nevertheless, the differences were statistically significant, which is remarkable and also demonstrates a strongly homogenous effect of the product.



IMPROVED FRUIT QUALITY: Overall, treatments with 4-Vita increased the quality of the apples even in comfortable water conditions. In particular, they had a huge effect on coloration, which is a key quality factor in red apples varieties such as Gala.

The treatments dramatically increased coloration. A visual assesment was performed and we observed up to 47.5% in the comfort water scheme and 50.1% in the water stress scheme. An anthocyanin analysis assessment as also been performed, and we observed up to 7.2% in the comfort water scheme and 9.7% in the water stress scheme.

**COLORATION:** A clear positive impact of 4-Vita applications on fruit coloration, in both situations: comfort and water stress.







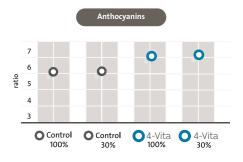




**B4** 

Fruit weight (g)		
Control 100% water	187,83 a	
Control -30% water	188,09 ab	
4-Vita 100% water	188,89 b	
4-Vita -30% water	188,88 b	

**ANTHOCYANINS PIGMENTS CONTENT:** A clear positive impact of 4-Vita applications on fruit pigments content, in both situations: comfort and water stress.

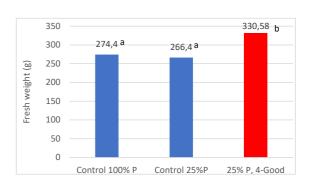




fiii

RESULTS

#### BETTER ROOT WEIGHT AND QUALITY



Treatment	Caliber	BRIX°	OD538*
FP, 100% P	82.4 a	15.5 a	1.5 a
FP, 25%P	83.3 a	15.4 a	1.4 a
25% P, 4-Good	86.5 a	15.7 a	1.7 b





# 4-Good®

NUTRIENT USE EFFICIENCY IN CONDITIONS WITH -75% OF PHOSPHATE REDUCTION

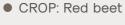




Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Liliana
- YEAR: 2018
- LOCATION: Vicenza, Italy
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Landlab
- DEMONSTRATION TRIAL: B4





## Control: Farmer practice

Treatment:

Ż

#### P4P<sup>®</sup> 4-Good - 4 applications x 2.75 l/ha

First treatment at 4-6 leaves stage, then other 3 times with a 1 week interval



20-24% Yield improvement. \*Higher betalain content 13-20%. With just -3% 2decrease in yield between the full P and -75% P control modalities, and with more than 20% increase in yield for the -75% P + 4-Good modality, we clearly can put forward an increased NUE effect, statistically proven.



# 4-Good<sup>®</sup>

plantsforplants

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner

#### **BETTER ABILITY TO ASSIMILATE NUTRIENTS**

- CROP: Sugar beet
- VARIETY: Fred Strube
- YEAR: 2018/2019
- LOCATION: Osijek, Croatia
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: University Croatia -Landlab
- DEMONSTRATION TRIAL: B4

Control: Farmer practice



# TRIAL SET-UP

#### Treatment:

	Control 100% P	Control -30% P	P4P <sup>®</sup> 4-Good -30% P
Ż	2x applications	2x applications	2x applications: 1st app. at 3 different phenologic stages (BBCH15, BBCH18 and BBCH30).The 2nd app. is done 10 to 14 days after, according the PPP* application date

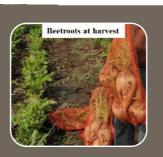
\*PPP = Plant Protection Product.

Fertilization management:

- 30% P reduction on fertilizer applied. Base dressing applied manually. 120 kg/ha for the 100% P and 83,3 kg/ha for the -30% P modalities. The NPK fertilizer used was 7-20-30. The difference in the required amount of nitrogen was compensated with urea and K2SO4.



reatments with P4P 4-Good have shown a very significant increase on yield, Brix and Sugar yield at both dosages and at all the BBCH stages where it was applied. No significant difference between the 2 controls (100% P and 70% P) were noted.



# PLANTS FOR PLANTS<sup>®</sup>



#### IMPROVED YIELD AND SUGAR CONTENT

**IMPROVED SUGAR YIELD:** The different P application did not affect sugar production, as the positive and negative controls are in the same statistical class. However, treatments with 4-Good increased °Brix at both dosage and at all the BBCH stages where it was applied. Given the higher yield and the higher °Brix, the sugar yield was dramatically increased at both dosage and at all the BBCH stages where it was applied. The maximum sugar yield was reached at the BBCH of 15 and 30 (+7,1 and +7,5 t/ha respectively). Impressive results, all very significant.

	Yield (T/Ha)	°Brix	Sugar (T/Ha)
Control 100% P	49.1 a	14.8 a	8.2 a
Control -30% P	52.4 a	14.8 a	8.8 a
4-Good -30% P (BBCH15)	86.4 b	18.4 c	15.9 d
4-Good -30% P (BBCH18)	75.9 c	19 d	14.4 c
4-Good -30% P (BBCH30)	85 d	19.1 d	16.3 d

NUTRIENT ROOT ANALYSIS: At harvest, the roots were also analysed for nutrients content. The control plants showed statistically significant higher content of N and Na, while all entries treated with 4-Good showed a higher content of K. No difference with the P content in the root.

	N %	К %	Na %
Control 100% P	0.88 b	1.83 a	0.19 b
Control -30% P	0.87 b	1.84 a	0.18 b
4-Good -30% P (BBCH15)	0.62 a	1.94 c	0.12 a
4-Good -30% P (BBCH18)	0.62 a	1.91 bc	0.13 a
4-Good -30% P (BBCH30)	0.65 a	1.86 ab	0.13 a

The uptake of the nutrient in kg/ha was also calculated, by multiplying the % of the element for the yield in dry matter. Although the % of N and Na was lower in the treated entries since the yield was much higher, the amount of these elements used per Ha was much higher in the treated plants.

The proportion and amount of K and Na in the sugarbeet plant may also be important because of a positive correlation between K fertilization and sucrose concentration, and a high negative correlation between Na and sucrose. Also, nitrogen (N) uptake and the proportion and amounts of K and Na have a major influence on the sucrose concentration and root quality.

Thus, high sucrose concentration and root quality are generally associated with low to moderate N uptake, low Na concentration and high K:Na ratio (Carter, 1985). The treated entries showed the highest K uptake, lower %N and higher K/Na ratio, and this could have contributed to the increase sugarbeet quality seen as an increase in sugar yield.

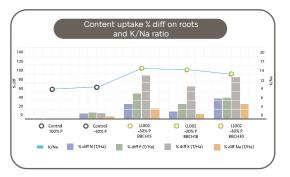








TRIAL RESULTS **R4** 



# 4-Good<sup>®</sup>

plantsforplants<sup>®</sup>

Plants for Plants® Life Project

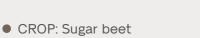
This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner

#### CONSERVATION OF YIELD **DESPITE P2O5 REDUCTION**



- VARIETY: KWS Marenka
- YEAR: 2020
- LOCATION: Celije, Croatia
- TREATED AREA: Ha
- EXECUTED BY: Horticentar
- APPLICATION: Foliar
- DEMONSTRATION TRIAL: B5



TRIAL RESULTS PAGE 52

**B5** 







#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Good®

plantsforplants

Plants for Plants® Life Project This project is co-funded by the

European Union's LIFE Programme

**TRIAL SET-UP** 

THE SAME TOTAL YIELD IN **50% LESS OF PHOSPHATE CONDITIONS** 



#### CROP: Corn

- VARIETY:
- YEAR: 2021

Treatment:

- LOCATION: Senec, Slovakia
- TREATED AREA: 5 Ha
- APPLICATION: Foliar
- EXECUTED BY: MV Services
- DEMONSTRATION TRIAL: B5





Treated with P4P<sup>®</sup> 4-Good and 30% reduction P2O5

First application (9L/Ha) - BBCH 18-30

Second application (9L/Ha) - 15 days later

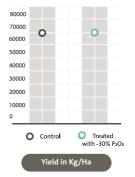






Vields for the full dose of P2O5 (104 Kg/Ha) for UTC were equivalent to 4-Good treated with a 20% reduction of P2O5 (73 Kg/Ha) with both modalities at 71 MT/Ha - no difference in sugar content was observed with both values at 16.9%. This is clearly due to an increased NUE for the treated part, as the yield was the same despite an important reduction of P2O5 fertilization.

TOTAL YIELD IN KG/HA CONSERVED **DESPITE 30% REDUCTION OF P2O5 UNITS PER HECTARE** 



CONCLUSION

FII

RESULTS

LET'S MAKE THE GREEN SWITCH

with only half the usual dose of phosphate applied, we have got the same results on the treated area as on the control plot. The result is more than satisfactory, because we had the same return with 50% less Phosphate input.

#### NO DIFFERENCE IN QUANTITY BUT BETTER QUALITY OF KERNELS

Total yield	Weight kernels (kg)	
Control	7.5	10.3
P4P <sup>®</sup> 4-Good	7.52	12.2







Control: Farmer practice 52 Kg P2O5

Treated with P4P <sup>®</sup> 4-Good	
FP - 50% P2O5 (30.5Kg P2O5) + 6.5 L/Ha of P4P® 4-Good	15 May 2021
FP - 50% P2O5 (30.5Kg P2O5) + 6.5 L/Ha of P4P® 4-Good	25 May 2021

# 4-Vita®

#### BETTER RESISTANCE OF THE CROP TO WATER STRESS

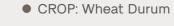




Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: -
- YEAR: 2018/2019
- LOCATION: Sicili, Italy
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Landlab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 54

**B4** 



#### Control: Farmer practice

#### Treatment:

	Control	P4P <sup>®</sup> 4-Vita
Ż	2x applications before the start of the drought stress with 10 days interval	2x applications before the start of the drought stress with 10 days interval



eliar applications of P4P 4-Vita increased wheat production, slightly compensating the losses due to the not optimal weather.







#### PLANTS FOR PLANTS<sup>®</sup>



#### **IMPROVED YIELD**

TREATMENTS INCREASED WHEAT PRODUCTION UP TO 10%: A CLEAR POSITIVE TREND EVEN IF NOT STATISTICALLY SIGNIFICANT.

	Weight straw/sqm (g)	Yield (t/ha)	ткw (g)
Control	477 a	2.95 a	41.33 a
4-Vita	466 a	3.25 a	44.28 a

In May, heavy rainfall occurred and temperatures dropped to below average temperatures temperatures followed by a hot and dry June. This could explain why products applications did not have a statistically significant impact on the yield, as the putative drought stress did not occur during spike growth. However, as a clear trend, 4-Vita at the lower dosage increased total yield and kernels weight (Thousand Kernels Weight, TKW) by 10,3% and 7,1% respectively equal to 30 q/ha and 3 g/1000 kernels more than the Control.





# 4-Vita®

#### BETTER RESISTANCE OF THE CROP TO WATER STRESS





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:





• CROP: Wheat

- YEAR: 2018/2019
- LOCATION: Bobrowniki, Poland
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Landlab
- DEMONSTRATION TRIAL: B4



TRIAL RESULTS PAGE 56

**B4** 



## Control: Farmer practice

#### Treatment:

	Control	P4P <sup>®</sup> 4-Vita
Ż	2x applications before the putative start of the drought stress with 10 days interval	2x applications before the start of the drought stress with 10 days interval



-4P 4-Vita treatments on wheat showed a clear increase of 6% on yield in comfort situation as 2019 was not a very dry season in Poland. This is encouraging as results are statistically significant, proving efficiency on yield. We also noticed positive trends on qualitative aspects.



## fiii RESULTS

PLANTS FOR PLANTS<sup>®</sup>

#### **IMPROVED YIELD**

SIGNIFICANT DIFFERENCE.



WE DID NOT OBSERVE STATISTICAL DIFFER-ENCE ON QUALITY PARAMETERS HOWEVER SOME TRENDS CAN BE NOTED: The Thousand Kernel Weight (TKW) was not influenced by the application. This could be a possible indication of a decrease in kernels loss in the treated entries, as the TKW did not change. The HectoLitre Weight (HLW) in kg/hl is an indication of the grain density. Many markets request specific HLW depending on the final product.

For example, some millers require a minimum of 76kg/hl, value of 72 kg/hl. In this trial, we notice a positive trend of the HLW on the treated crops.

	TKW (g)	Humidity	HLW (kg/hl)
Control	37.95 a	11.90 a	75.42 a
4-Vita	37.89 a	11.85 a	76.10 a













#### TREATMENT INCREASED WHEAT PRODUCTION UP TO ALMOST 6%. A STATISTICALLY

Yield (t/ha)				
Control	5.51 a			
4-Vita	5.83 b			



# 4-Vita<sup>®</sup>

#### **INCREASE OF CORN YIELD DESPITE IRRIGATION REDUCTION**

CROP: Corn

• YEAR: 2020

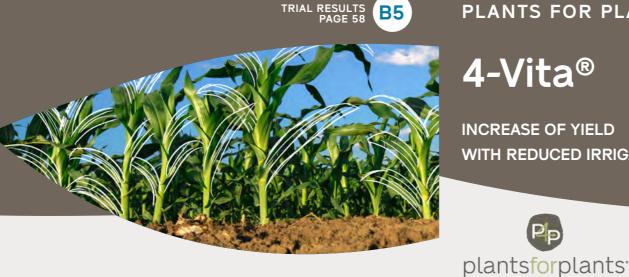
VARIETY: P900 Pionneer

TREATED AREA: - Ha

APPLICATION: Foliar

EXECUTED BY: Arterris

LOCATION: Montech, France



#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Vita®

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

VAI

LET'S MAKE THE GREEN SWITCH

**INCREASE OF YIELD** WITH REDUCED IRRIGATION ON CORN



#### CROP: Corn

- VARIETY: Pionneer 0937
- YEAR: 2020
- LOCATION: Aleksandropouli, Greece
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Agro Hellas
- DEMONSTRATION TRIAL: B5

Control: Farmer practice

Treatment:



plantsforplants

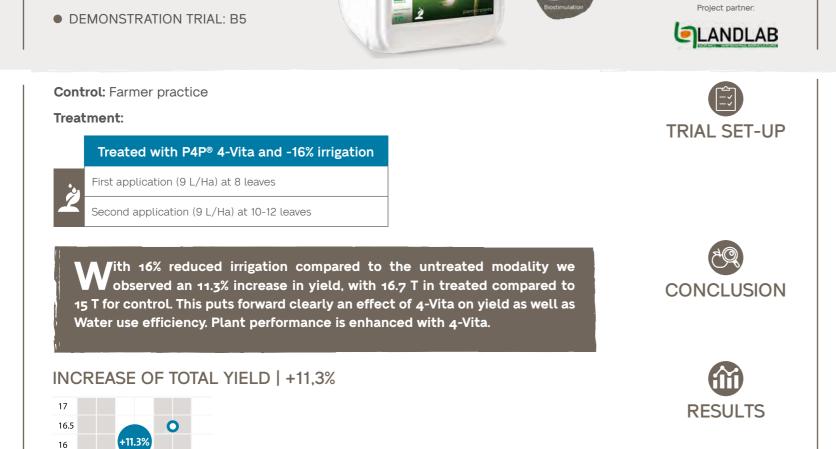
Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Proiect partner





15.5

15

14.5

14

0

O Control

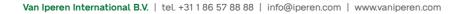
Yield in T/Ha

O Treated



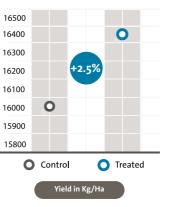
CONCLUSION





ith -25% of irrigation time on average (see chart for details), we have a 2.5% increase in yield when using 4-Vita. Significant amounts of water can be saved with a slightly better crop performance. A clear biostimulation effect on water use efficiency is put forward.

#### INCREASE OF TOTAL YIELD | +2,5%







#### Treated with P4P<sup>®</sup> 4-Vita and -25% water

First application (9 L/Ha each) at 8 to 10 leaves

Second application (9 L/Ha) - 15 days later



# 4-Vita<sup>®</sup>

#### **INCREASED YIELD** THANKS TO BETTER WUE

plantsforplants

Plants for Plants® Life Project

This project is co-funded by the

European Union's LIFE Programme

under Grant Agreement LIFE18 ENV/NL/000043.

Project partner:



#### PLANTS FOR PLANTS<sup>®</sup>

# 4-Vita®

**INCREASE OF YIELD** WITH REDUCED IRRIGATION ON CORN



# plantsforplants



Plants for Plants® Life Project This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.

Project partner 

**TRIAL SET-UP** 



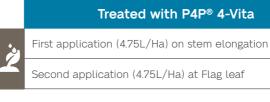
fiii RESULTS

LET'S MAKE THE GREEN SWITCH



- VARIETY: Pionneer 0937
- YEAR: 2020
- LOCATION: Sicily, Italy
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: LandLab
- DEMONSTRATION TRIAL: B5

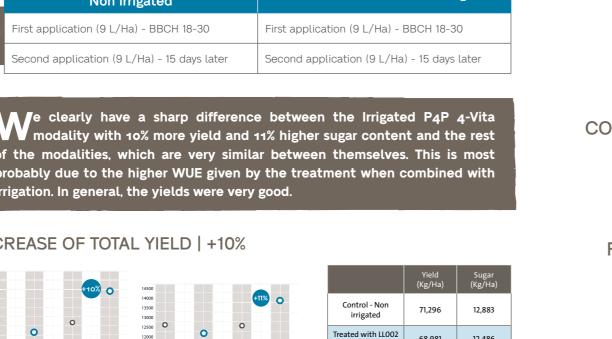
Control: Farmer practice Treatment:



n rainfed durum wheat cultivation yields are often low, due to water scarcity. With less water, P4P 4-Vita is a promising solution for increased water efficiency and higher yields on this type of crops. Indeed with two applications of P4P 4-Vita we had 20% increase on yield.

#### **INCREASE OF TOTAL YIELD | +20%**

4				
3.5		+20		
3			C	)
2.5	0			
2				
1.5				
1				
0.5				
0				
Control Treated				



#### INCREASE OF TOTAL YIELD | +10%



	Yield (Kg/Ha)	Sugar (Kg/Ha)
Control - Non irrigated	71,296	12,883
 Treated with LL002 - Non irrigated	68,981	12,486
Control - Irrigated	70,602	12,807
Treated with LL002 - Irrigated	77,546	14,137





**TRIAL SET-UP** 









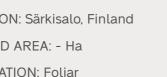


	Treated with P4P <sup>®</sup> 4-Vita - Non irrigated	Treated with P4P <sup>®</sup> 4-Vita - Irrigated
)	First application (9 L/Ha) - BBCH 18-30	First application (9 L/Ha) - BBCH 18-30
	Second application (9 L/Ha) - 15 days later	Second application (9 L/Ha) - 15 days later

• VARIETY: Joker

• CROP: Sugar beet

- YEAR: 2020
- LOCATION: Särkisalo, Finland
- TREATED AREA: Ha
- APPLICATION: Foliar
- EXECUTED BY: Kekkila-Vapo
- DEMONSTRATION TRIAL: B5















	Treated with P4P <sup>®</sup> 4-Vita - Non irrigated	Treated with P4P <sup>®</sup> 4-Vita - Irrigate
Ż	First application (9 L/Ha) - BBCH 18-30	First application (9 L/Ha) - BBCH 18-30
	Second application (9 L/Ha) - 15 days later	Second application (9 L/Ha) - 15 days later

Treatment:

Non ingated	
First application (9 L/Ha) - BBCH 18-30	First application (9 L/Ha) - BBCH 18-
Second application (9 L/Ha) - 15 days later	Second application (9 L/Ha) - 15 day

of the modalities, which are very similar between themselves. This is most probably due to the higher WUE given by the treatment when combined with irrigation. In general, the yields were very good.





#### Treated with P4P<sup>®</sup> 4-Vita

# 4-Vita<sup>®</sup>

#### **INCREASE OF TOTAL YIELD IN STRESSFUL CONDITIONS**





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: KWS Irina
- YEAR: 2021
- LOCATION: Kemiö, Finland
- TREATED AREA: 5 Ha
- EXECUTED BY: Kekkila/Vapo
- APPLICATION: Foliar
- DEMONSTRATION TRIAL: B5





TRIAL RESULTS B5





plantsforplants



# 4-Vita<sup>®</sup>

**INCREASE OF TOTAL YIELD IN COMFORT CONDITIONS** 



- CROP: Canola (Organic)
- VARIETY: KWS Blue Star
- YEAR: 2021
- LOCATION: Dalj, Croatia
- TREATED AREA: 5 Ha
- APPLICATION: Foliar
- EXECUTED BY: Sjetva doo, Morpho Agro
- DEMONSTRATION TRIAL: B5









## INCREASE OF TOTAL YIELD | +505 Kg/Ha

n similar, but this year stressful conditions due to dry periods, we calculated +12% yield increase. Grower comment: Very dry year – yields in general

Total yiel	d (Kg/Ha)
Control	4183
P4P <sup>®</sup> 4-Vita	4688

were below the average.









+10% Yield in similar conditions.

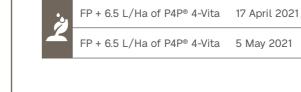
#### INCREASE OF TOTAL YIELD | +10%

Total yield (MT/Ha	
Control	2.1
P4P <sup>®</sup> 4-Vita	2.31





Control: Farmer practice Treatment: **TRIAL SET-UP** 







#### Treated with P4P<sup>®</sup> 4-Vita



TRIAL RESULTS B5

# 4-Vita®

INCREASE OF TOTAL YIELD IN STRESSFUL CONDITIONS





Plants for Plants® Life Project

This project is co-funded by the European Union's LIFE Programme under Grant Agreement LIFE18 ENV/NL/000043.





- VARIETY: Reform
- YEAR: 2021
- LOCATION: Rheinland (Nideggen-Muldenau), Germany
- TREATED AREA: 4 Ha
- EXECUTED BY: Hauert
- APPLICATION: Foliar
- DEMONSTRATION TRIAL: B5







## Treatment:

	Treated	with P4P <sup>®</sup> 4-Vita
<u>,                                    </u>	FP + 6.5 L/Ha of P4P® 4-Vita	1 April 2021 BBCH 25, at mid tillering
2	FP + 6.5 L/Ha of P4P® 4-Vita	24 April 2021 Flag leaf



ncrease in total yield was 14.3%. Despite the abundant rainfall from mid-May, the increase in yield is probably due to the fact that the crop came out of winter with a water deficit. It is noteworthy that in mid-June the yield forecasts were between 105-110 qt and then collapsed from end of June due to the cold and extreme humidity.

## fiii RESULTS

## INCREASE OF TOTAL YIELD | +14.3%

Total yield (QT/Ha)	
Control	70
P4P <sup>®</sup> 4-Vita	80





High Performing Solutions | P4P

## Plants for Plants 4-Good



#### Composition (%w/w)

1.2%
1.0%
20%
43%
54%

#### Agronomical Targets



#### Compatibility

In case of foliar feeding as part of a mix with crop protection products or other fertilizers, a compatibility test has to be done prior to preparing the spray-mix.

#### Packaging



Van Iperen Plants for Plants 4-Good is part of the new generation of plantbased Biostimulants developed for a more sustainable agriculture.

Traditionally, biostimulants were often seen as a way to counter abiotic stress and stimulate plant performance despite adverse conditions. However, very few have so far targeted natural Oxidative Stress management as well. Oxidative stress is a natural and continuously occurring process in all living organisms that leads ultimately to cell degradation and death. 4-Good drastically reduces natural oxidative damage on the cells hence greatly preserving the yield potential whatever the crop condition, and that is a true innovation on the biostimulant scene. Additionally, 4-Good enhances Nutrient Use Efficiency (NUE) of the crop by activating key genes in charge of nutrient transportation inside the plant. 4-Good has been developed for all crops in both comfort and stress conditions. Applied in foliar during the early stages of the crop cycle, 4-Good will improve the crop establishment ensuring a better nutrient uptake throughout the crop cycle, resulting in higher yields and crop quality.

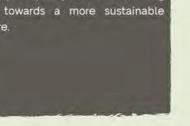
- Fully controlled process from plant material to final product
- Inducing reduction of natural oxidative stress phenomena
- Enhancing NUE, ensuring higher yield and crop quality .
- Suitable for organic farming in compliance with European Regulation (EU) 2018/848
- Safe for users, consumer and for the environment
- Developed for foliar application

#### Product Characteristics

- 100% natural, dark red liquid
- Patented production process
- Keep as cold as possible, below 25 °C as maximum, and away from direct sunlight

#### Did you know?

Plants for Plants is a concept by Landlab and Van Iperen granted by LIFE, the EU's funding instrument for climatic and environmental actions. With Plants for Plants, we aim to improve crop performance with higher efficiency of agronomical inputs, which comes in line with Europe's policy for the coming decades towards a more sustainable agriculture.



In case of foliar feeding as part of a mix with crop protection products or other fertilizers, a compatibility test has to be done prior to preparing the spray-mix.

#### Let's make the green switch!

We are Van Iperen International a Dutch producer of Specialty Fertilizers and Biostimulants. We are eager to change the rules of the game in plant nutrition. by providing highly innovative solutions to growers for more sustainable agriculture. Your local Van Iperen Sales Manager will help you and guide you to make the green switch together.

www.vaniperen.com

# and



Plants for Plants 4-Good | P4P Sheet 2 / 2

#### Dosage | Foliar application

Crop	Application date	Max L/ha/season
Arable crops	2 applications: • As of enough leaf coverage • 7 - 14 days interval	5-6
Industrial crops	2 - 3 applications: • As of plant establishment • 7 - 14 days interval	5-6
Vegetables	2 applications: • As of enough leaf coverage • Until generative stage	5-6
Fruit trees and Vineyards	2 applications: • As of enough leaf coverage • Until generative stage	5-6

#### Mode of action

Genomic and metabolomic methods have identified a clear mode of action for 4-Good. On one hand, 4-Good improves Phosphate assimilation thanks to an upregulation of PHT2:1 gene, a chloroplastic Phosphate transporter, and on the other, we measured significantly fewer cell-damaging oxidative components, keeping the plant healthy despite natural oxidative phenomena, safeguarding the optimal performance potential of the crop

The mentioned indicated dosages and application stages are given as a guideline. Exact dosages, concentration and application stage are subject to local conditions, use of other fertilizers and can only be given after an objective diagnosis.

High Performing Solutions | P4P

## Plants for Plants 4-Vita



#### Composition (%w/w)

Potassium Oxide	1.2%
Flavonoids	1.0%
Organic Acids	20%
Organic Matter	43%
Dry matter	54%

#### Agronomical Targets



#### Compatibility

In case of foliar feeding as part of a mix with crop protection products or other fertilizers, a compatibility test has to be done prior to preparing the spray-mix.

#### Packaging



Van Iperen Plants for Plants 4-Vita is part of the new generation of plantbased Biostimulants developed for a more sustainable agriculture.

Traditionally, biostimulants were often seen as a way to counter abiotic stress and stimulate plant performance despite adverse conditions. However, very few have so far targeted natural Oxidative Stress management as well. Oxidative stress is a natural and continuously occurring process in all living organisms that leads ultimately to cell degradation and death. 4-Vita drastically reduces natural oxidative damage on the cells hence greatly preserving the yield potential whatever the crop condition, and that is a true innovation on the biostimulant scene. Additionally, 4-Vita enhances the Water Use Efficiency (WUE) of the crop by increasing its tolerance to drought and heat conditions through the protection of the photosynthetic system in the plant. 4-Vita has been developed for all crops in both comfort and stress conditions. Applied in foliar during the advanced vegetative stages of the crop cycle. 4-Vita will optimize the crop's water supply ensuring a better performance throughout the season, resulting in higher yields and crop quality.

- Fully controlled process from plant material to final product
- Inducing reduction of natural oxidative stress phenomena
- Enhancing WUE, ensuring increased yield and crop quality .
  - Safe for users, consumer and for the environment
- Suitable for organic farming in compliance with European Regulation (EU) 2018/848
- Developed for foliar application

#### **Product Characteristics**

- 100% natural, dark red liquid
- Patented production process
- Keep as cold as possible, below 25 °C as maximum, and away from direct sunlight

#### Did you know?

Plants for Plants is a concept by Landlab and Van Iperen granted by LIFE, the EU's funding instrument for climatic and environmental actions. With Plants for Plants, we aim to improve crop performance with higher efficiency of agronomical inputs, which comes in line with Europe's policy for the coming decades towards a more sustainable agriculture



Let's make the green switch!

We are Van Iperen International a Dutch

producer of Specialty Fertilizers and

Biostimulants. We are eager to change

the rules of the game in plant nutrition.

by providing highly innovative solutions

to growers for more sustainable

agriculture. Your local Van Iperen Sales

Manager will help you and guide you to

make the green switch together.

www.vaniperen.com

Crop

Arable crops

Fruit trees and Vir

200

F.

Vegetables

#### Mode of action

Genomic and metabolomic methods have identified a clear mode of action for 4-Vita. On one hand, 4-Vita improves water use efficiency and drought tolerance of the crop by modulating the lipidic membranes to protect the photosynthetic system in the chloroplast, and on the other, we measured significantly fewer cell-damaging oxidative components, keeping the plant healthy despite natural oxidative phenomena, safeguarding optimal performance and potential of the crop.

The mentioned indicated dosages and application stages are given as a guideline. Exact dosages, concentration and application stage are subject to local conditions, use of other fertilizers and can only be given after an objective diagnosis.



#### Plants for Plants 4-Vita | P4P Sheet 2 / 2

#### Dosage | Foliar application

	Application date	Max L/ha/season
	<ul> <li>2 - 3 applications:</li> <li>During intensive vegetative growth and generative phase</li> <li>7-10 days before phenological stages with critical water needs</li> </ul>	5-6
neyards	3 applications: • After petal fall • 7-10 days before phenological stages with critical water needs	5-6
	<ul> <li>2 - 3 applications:</li> <li>During intensive vegetative growth and generative phase</li> <li>7-10 days before phenological stages with critical water needs</li> </ul>	5-6

In case of foliar feeding as part of a mix with crop protection products or other fertilizers, a compatibility test has to be done prior to preparing the spray-mix.

High Performing Solutions | P4P

## Plants for Plants 4-Terra



#### Composition (%w/w)

2.5%
0.8%
2.2%
46%
55%

#### Agronomical Targets



#### Compatibility

Compatible with most water-soluble fertilizers

#### Packaging



Van Iperen Plants for Plants 4-Terra is part of the new generation of plantbased Biostimulants developed for a more sustainable agriculture.

4-Terra has a proven dual action on enhancing Nutrient Use Efficiency (NUE) of the crop both on soil microflora as well as on the plant itself. making it a unique solution combining soil and plant action.

4-Terra has been developed for all fertigated crops in both comfort and stress conditions. Applied in fertigation during the early stages of the crop cycle, 4-Terra will improve the crop establishment ensuring a better nutrient uptake throughout the crop cycle, resulting in higher yields and crop quality.

Fully controlled process from plant material to final product

- Enhancing NUE, ensuring higher yield and crop quality .
- Improving Phosphate assimilation by combining plant and soil action
- Suitable for organic farming in compliance with European Regulation (EU) 2018/848
- Safe for users, consumer and for the environment
- Developed for fertigation and soil application

#### Product Characteristics

- 100% natural, dark red liquid
- Patented production process
- Keep as cold as possible, below 25 °C as maximum, and away
- from direct sunlight Easy to handle and apply

#### Did you know?

Plants for Plants is a concept by Landlab and Van Iperen granted by LIFE, the EU's funding instrument for climatic and environmental actions. With Plants for Plants, we aim to improve crop performance with higher efficiency of agronomical inputs, which comes in line with Europe's policy for the coming decades towards a more sustainable agriculture.



#### Let's make the green switch!

We are Van Iperen International a Dutch producer of Specialty Fertilizers and Biostimulants. We are eager to change the rules of the game in plant nutrition. by providing highly innovative solutions to growers for more sustainable agriculture. Your local Van Iperen Sales Manager will help you and guide you to make the green switch together.

www.vaniperen.com





Dosage | Fertigation

Crop Fruit trees and Vir 1

Vegetables

#### Mode of action

Genomic and metabolomic methods have identified a clear mode of action for 4-Terra. 4-Terra improves Phosphate assimilation thanks to an up-regulation of PHT2;1 gene a chloroplastic Phosphate transporter. Furthermore, we measured a significant increase of microbial population allowing P solubilization in the soil (microbiome effect).

The mentioned indicated dosages and application stages are given as a guideline. Exact dosages, concentration and application stage are subject to local conditions, use of other fertilizers and can only be given after an objective diagnosis.

	Application date	Max L/ha/season
neyards	• Split over at least 3 to 4 times during fertigation program from early start until fruit set stage	16-18
	• Split over at least 3 to 4 times during fertigation program from start until early production phase	16-18





IPE

#### Plants for Plants® 4-Good

- Plant-based Biostimulant targeting NUE ensuring higher yield and crop quality
- Developed for all crops in comfort and stress conditions
- Applied at the early stage of the crop cycle for an improved establishment of the crop, ensuring better nutrient uptake
- Reduction of oxidative stress: decreased ROS (Reactive Oxygen Species) production. Decreased need of antioxidative system activity and antioxidants production. Less energy needed for ROS detoxification, more energy to grow
- Improved Phosphate assimilation due to chloroplastic orthophosphate PHT2;1 gene activation, a Phosphate transporter
- For foliar application

#### Plants for Plants® 4-Vita

- Plant-based Biostimulant targeting WUE ensuring higher yield and crop quality
- Developed for all crops in comfort and stress conditions
- Applied before periods of strong growth or heat
- Reduction of oxidative stress: decreased ROS (Reactive Oxygen Species) production. Decreased need of antioxidative system activity and antioxidants production. Less energy needed for ROS detoxification, more energy to grow.
- Maintain efficient photosynthetic activity: increased protection of the photosystem by modulating the chloroplastic membrane
- For foliar application

#### Plants for Plants<sup>®</sup> 4-Terra

- Plant-based Biostimulant targeting NUE ensuring higher yield and crop quality
- Developed for cash crops in comfort and stress conditions
- Applied at the early stage of the crop cycle for an improved establishment of the crop, ensuring better nutrient uptake
- Improved Phosphate assimilation due to chloroplastic orthophosphate PHT2;1 gene activation, a Phosphate transporter
- Increased microbial activity in the soil as well as nutrient availability
- For fertigation



### "High quality end product."

Adriano Altissimo Scientific Manager, Landlab research center, Italy

"Firstly, we figured out what the crop lacked. Then we looked for another species that had already acquired the properties that were needed. We then took a tailored extract and applied it to the crop through fertilization programs. By doing so, we were able to trigger specific reactions in the crop."









