

Supplementary Table S1. Physical and chemical properties of the soil used for the greenhouse experiments.

sand (63 - 2.000 μm)	%	2.7
silt (2 - 63 μm)	%	67.1
clay (< 2 μm)	%	30.2
water content (WC)	%	4.5
water holding capacity (WHC)	%	23
pH-value, CaCl_2 -suspension		7.1
Carbonates, gas vol. after Scheibler	%	2
Humus, elementary analysis ($\text{C}_{\text{org}} \times 1.72$)	%	2.37
Carbon total (C), elementary analysis	%	1.45
Nitrogen (N), elementary analysis	%	0.162
Phosphorus (P), CAL-extract VDLUFA	mg/kg	100
Potassium (K), CAL-extract VDLUFA	mg/kg	149
Magnesium (Mg), CaCl_2 -extract VDLUFA	mg/kg	230
Sulphur (S), elementary analysis	mg/kg	250
Base saturation (Co-hexamine VDLUFA)	%	74
CAC_{pot} (Co-hexamine VDLUFA)	cmol(c)/kg	22
Potassium (K) exchangeable (Co-hexamine)	cmol(c)/kg	0.44
Magnesium (Mg) exchangeable (Co-hexamine)	cmol(c)/kg	2.38
Calcium (Ca) exchangeable (Co-hexamine)	cmol(c)/kg	13.5

Soil Analysis after: VDLUFA Methodenbuch 4. Auflage 1985 – 2020. VDLUFA-Verlag: Darmstadt, Germany.

Supplementary Table S2. Treatments, microbial strains and strain combinations used for experiment I.

Variant No.	Treatments		Codes
1	negative control (drought stress non-inoculated)		NC
	Single	Microorganism (with code number)	
2	C1	<i>Paraburkholderia phytofirmans</i> PsJN	PsJN
3	C2	<i>Pseudomonas</i> sp. KCZ4-3	KCZ
4	C3	<i>Rhizophagus irregularis</i> MUCL 41833	AM
5	C4	<i>Trichoderma asperelloides</i> A	TA
6	C5	<i>Pseudomonas brassicacearum</i> 3Re2-7	3Re27
7	C6	<i>Bacillus amyloliquefaciens</i> FZB42 (Rhizovital)	FZB
	Combinations		
8	I	<i>Pseudomonas protegens</i> 3BS, <i>P. jessenii</i> 17BS	PPS
9	II	<i>Kosakonia</i> sp. and <i>Herbaspirillum</i> sp.	KH
10	III	<i>Kosakonia</i> sp. and <i>Herbaspirillum</i> sp., <i>Rhizophagus irregularis</i> MUCL 41833	KHR
11	IV	<i>Pseudomonas brassicacearum</i> 3Re2-7 + <i>Rhizophagus irregularis</i> MUCL 41833	P&R
12	V	<i>Paraburkholderia phytofirmans</i> PsJN, <i>Rhizophagus irregularis</i> MUCL 41833	PaR
13	VI	<i>Paraburkholderia phytofirmans</i> PsJN, <i>Trichoderma asperelloides</i> A	PaT
14	VII	<i>Pseudomonas</i> sp. KCZ4-3 & <i>Rhizophagus irregularis</i> MUCL 41833	P4R
15	VIII	<i>Pseudomonas brassicacearum</i> 3Re2-7 & <i>Trichoderma asperelloides</i> A	PT
16	IX	<i>Rhizophagus irregularis</i> MUCL 41833, <i>Trichoderma asperelloides</i> A	RT
17	X	<i>Paraburkholderia phytofirmans</i> PsJN, <i>Rhizophagus irregularis</i> MUCL 41833, <i>Trichoderma asperelloides</i> A	PaRT
18	positive control (fully watered non-inoculated)		PC

Supplementary Table S3. Optical density corresponding to 10^7 cfu ml⁻¹ for each bacterial inoculant strain (pure liquid TSM as blank to adjust the NanoDrop™ spectrophotometer).

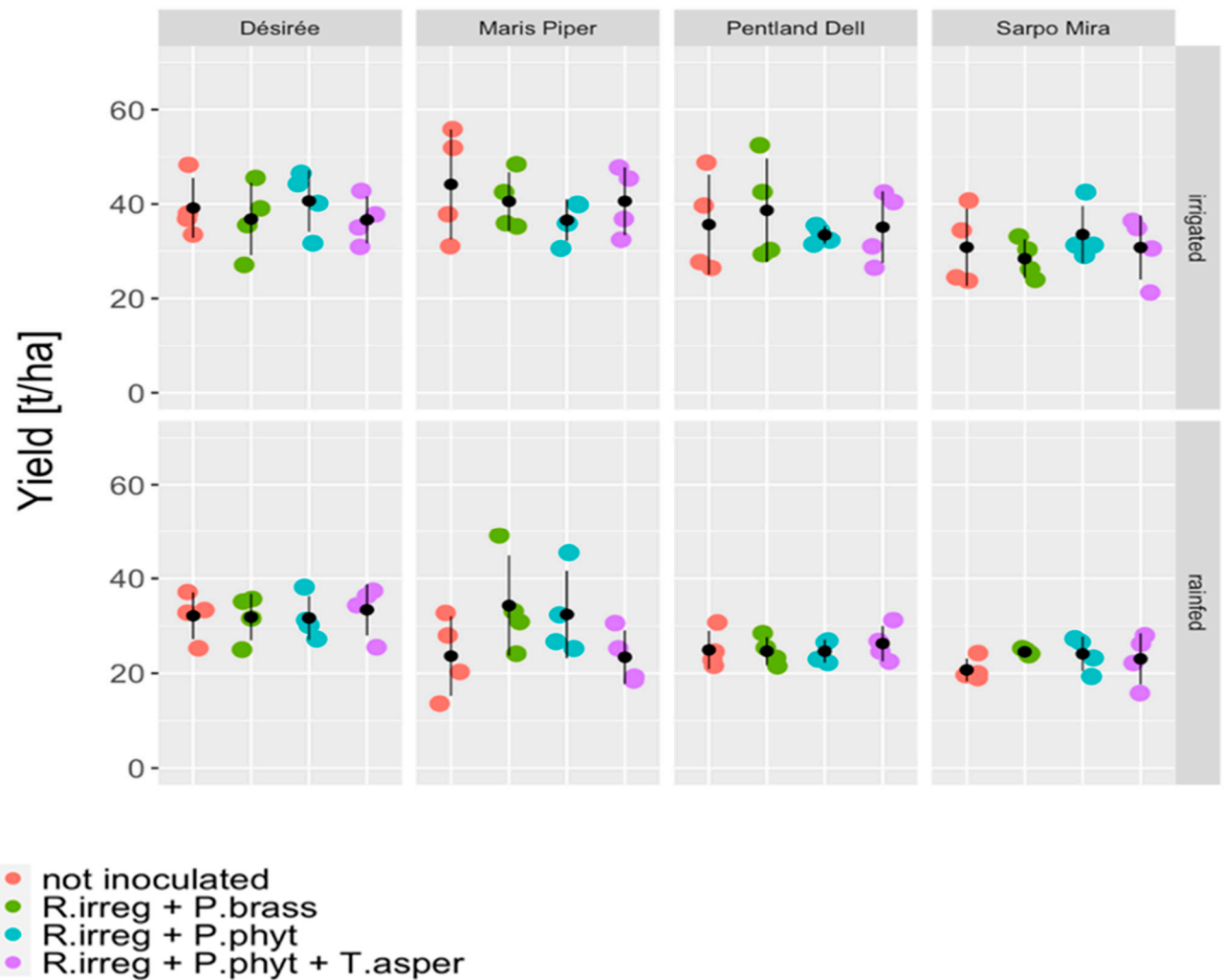
Bacterial strain	Target OD ₆₀₀
<i>Herbaspirillum</i> sp.	2.885
<i>Kasakonia</i> sp.	0.084
<i>Pseudomonas jessenii</i> 17BS	0.457
<i>Parabukholderia phytofirmans</i> PsJN	0.041
<i>P. brassicacearum</i> 3Re2-7	0.051
<i>Pseudomonas</i> sp. KCZ4-3	0.039
<i>Pseudomonas protegens</i>	0.100

Supplementary Table S4. Treatments, microbial strains and strain combinations used for experiment II-.

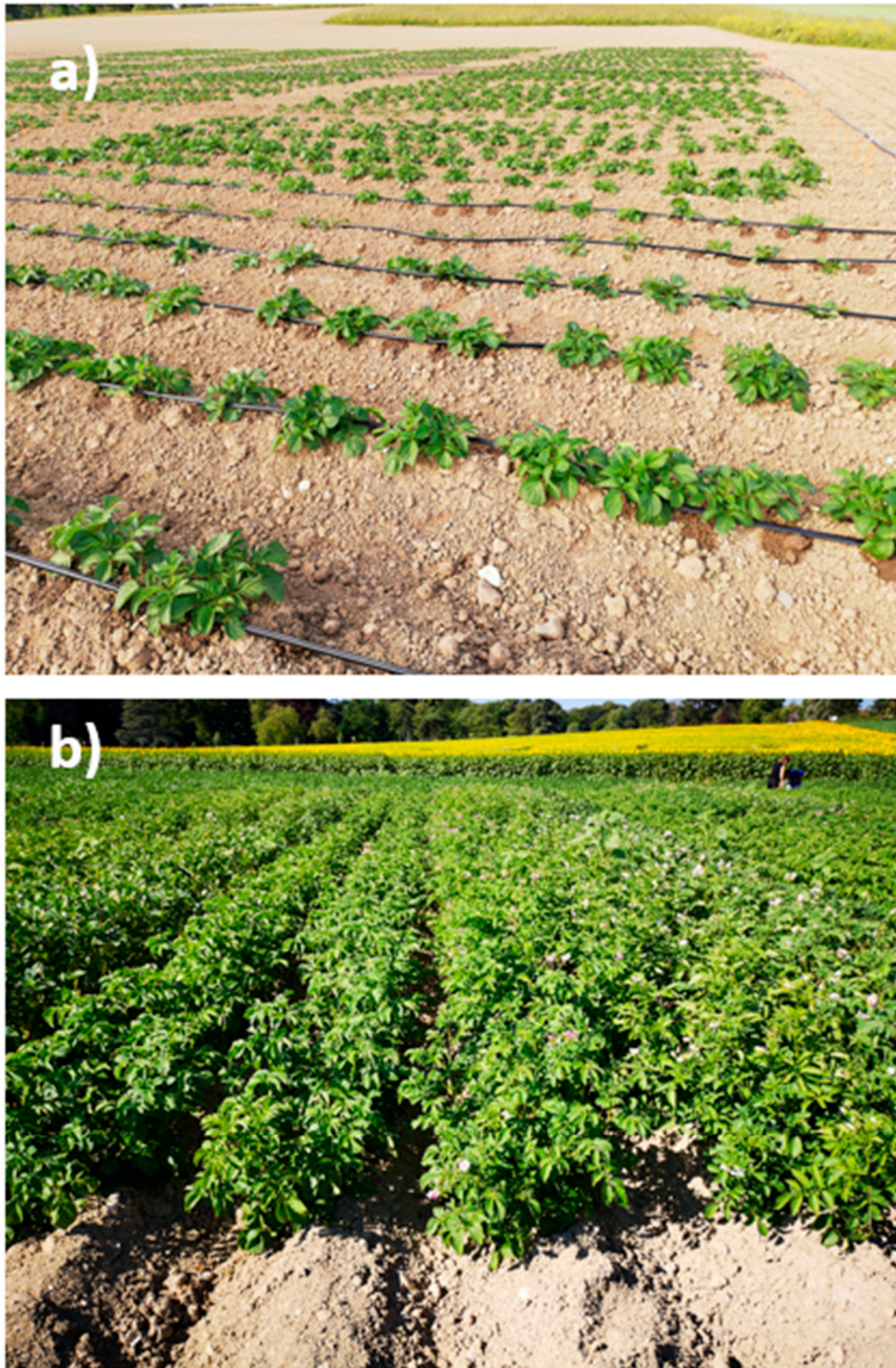
Variant No.	N form	Water	Inoculants	Codes
1	NO ₃ ⁻	Well-watered	non-inoculated	PC
2		Drought	non-inoculated	NC
3	NH ₄ ⁺	Well-watered	non-inoculated	PC
4		Drought	non-inoculated	NC
5			<i>Rhizophagus irregularis</i> MUCL 41833	AM
6			<i>R. irregularis</i> MUCL 41833+ <i>P. brassicacearum</i> 3Re2-7	AM+3Re
7			<i>R. irregularis</i> MUCL 41833+ <i>Herbaspirillum</i> sp	AM+Her
8			<i>Bacillus amyloliquefaciens</i> FZB42	FZB
9			<i>R. irregularis</i> MUCL 41833+ <i>B. amyloliquefaciens</i> FZB42	AM+FZB

Supplementary Table S5. Formulation and dosage of PGPM strains in the field trial.

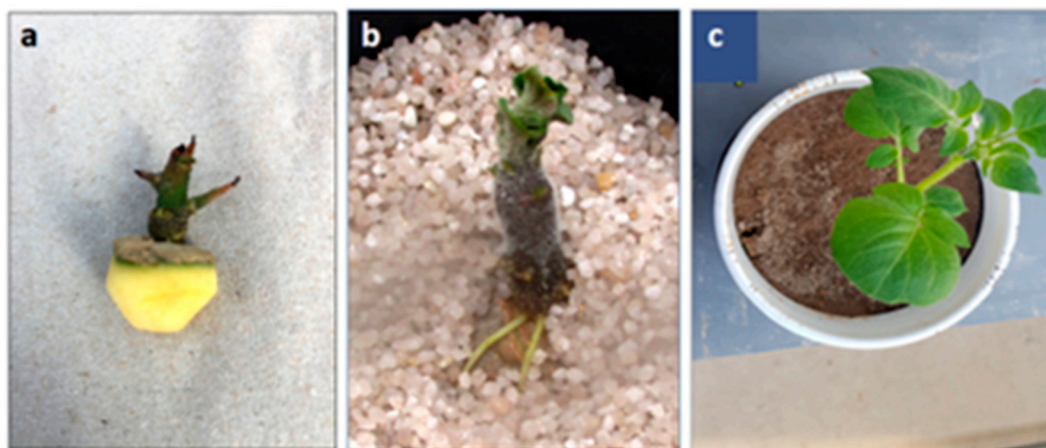
Strain	Formulation	Quantity per tuber	Inoculation density per tuber
<i>Rhizophagus irregularis</i> MUCL41833	Alginate beads	10 beads	~100 spores
<i>Pseudomonas brassicacearum</i> 3Re2-7	King B medium (diluted in 16l water prior to application)	20ml	2×10^8 CFU
<i>Paraburkholderia phytofirmans</i> PsJN	Lysogeny broth (diluted in 16l water for application)	20ml	1×10^8 CFU
<i>Trichoderma asperelloides</i> A	Dried (resuspended in 16l water for application)	20ml	1.1×10^6 CFU



Supplementary Figure S1. Tuber yield, in tons per hectare, for the field trial conducted in Switzerland. Potato varieties are presented separately along the horizontal axis, while irrigated and rainfed treatments were split between top and bottom panels, respectively. Colours represent control (red) or inoculations of consortia (R.irreg = *Rhizophagus irregularis* MUCL 41833; P. brass = *Pseudomonas brassicacearum* 3Re2-7; P. phyt = *Paraburkholderia phytofirmans* PsJN; T. asper = *Trichoderma asperelloides* A).



Supplementary Figure S2. The potato field experiment with drip irrigation vs rainfed conditions during early growth (a) and 45 days after planting (b).



d) Well-watered - Leaf damage score 0-1

e) Drought-stressed - Leaf damage score 7-8



Supplementary Figure S3. Pot experiments: Regeneration of potato plants (cv Alonso) from tuber cuttings (a), rooting in planting substrate (b) and young potato plant in the 4-5 leaf stage used for soil drenching with inoculants (c). Potato plant at 9 weeks after sowing grown under well-watered conditions (d) and after 6 weeks of drought stress with 20-25 % substrate water-holding capacity (e).