Supplementary Material

Figure S1. The random amplified polymorphic DNA (RAPD) profile of *S. meliloti* Algerian isolates. Dendrogram based on UPGMA clustering of Jaccard similarity coefficient of combined AP5 and P7 RAPD fingerprints of rhizobial strains.

Figure S2. Germination of *M. sativa* cultivars Etrusca and Marina under different concentrations of NaCl. Five biological replicates for each condition are reported, the error bars indicate the standard errors. Horizontal lines of boxes represent the mean values, whereas the whiskers represent mean values ± standard deviation. Different letters indicate statistically significant differences among all conditions tested (Kruskal-Wallis, Post-hoc test: Dunn's multi-comparative test, $p<0.05$).

Figure S3. Plant parameters of *M. sativa* cultivars Etrusca and Marina influenced by NaCl gradient. Boxplots of (A) Root length (cm) (B) Stem length (cm) and (C) Dry weight (g) from eight biological replicates. Horizontal lines of boxes represent the mean values, whereas the whiskers represent mean values ± standard deviation. Different letters indicate statistically significant differences among conditions tested (Kruskal-Wallis, Post-*hoc* test: Dunn's multi-comparative test, $p<0.05$). In (C) the mortality of *Medicago sativa* cultivars Marina and Etrusca under saline conditions is reported as the percentage of harvested death plants for each concentration of sodium chloride tested.

Figure S4. Experimental set-up for nodulation assays. (A) Growth chamber (B) *M. sativa* cv. Etrusca at 0 and 100 mM NaCl (negative control; no inoculation), (C) *M. sativa* cv. Etrusca plants inoculated with *S. meliloti* MO47(2) at 0 and 100 mM NaCl.

Figure S5. Survival of *S. meliloti* Algerian strains in compost at 4–6 °C. Each point represents average value of decimal logarithmic of viable cells for g^{-1} inoculant calculated on three replicates (with three independents counts *per* replicate). The error bars indicate the standard errors. Different letters indicate statistically significant differences (ANOVA, Post-hoc test: Tuckey test post-hoc, $p<0.05$).

Figure S6. Temperature and rainfall recorded during the field experiment. Maximum temperature, minimum temperature and rainfall were recorded at Montespertoli – Florence meteo station.

Figure S7. Alfalfa yield with different inoculant treatments in the field trial. Boxplot of wet weight (kg/ha) (A) and estimated dry weight (kg/ha) (B) of different inoculants formulated with *S. meliloti* strains MA10(1), MO35(1), MO15(1), GR4, MO56(1), negative control indicates unfertilized parcels sowed with un-inoculated seeds, positive control indicates fertilized parcels sowed with un-inoculated seeds. Horizontal lines of boxes represent the median, whereas the whiskers represent the maximal and minimal values. Asterisks indicates significant differences based on pairwise comparison between inoculants tested (T-test: ns for not significant, * for $p < 0.05$; ** for $p < 0.01$; *** for $p < 0.001$).

Table S1. List of *S. meliloti* strains used in this work.

Table S2. Main soil physico-chemical characteristics and count of indigenous nodulating rhizobia (Most Probable Number) of field experiments.

Table S3. Growth profiles of the rhizobia strains at 100 mM NaCl detected with Biolog Technology. For each replicate, normalized value was calculated as of the ratio of the Arbitrary OmniLog Units (AOU) detected at 100 mM NaCl concentration on the average value of AOU detected at the concentration of 0 mM of related strain. Data were expressed as the average of normalized values.

Table S4. Tuckey test post-hoc outputs on percentage of germination of *M. sativa* cultivars Marina and Etrusca at different NaCl concentrations. Values in tables indicate means of percentage of germination. Different superscript capital letters indicate results of Tuckey test post-hoc among NaCl concentrations for each cultivar. Different superscript small letters indicate results of Tuckey test post-hoc between two cultivars for each concentration of NaCl.

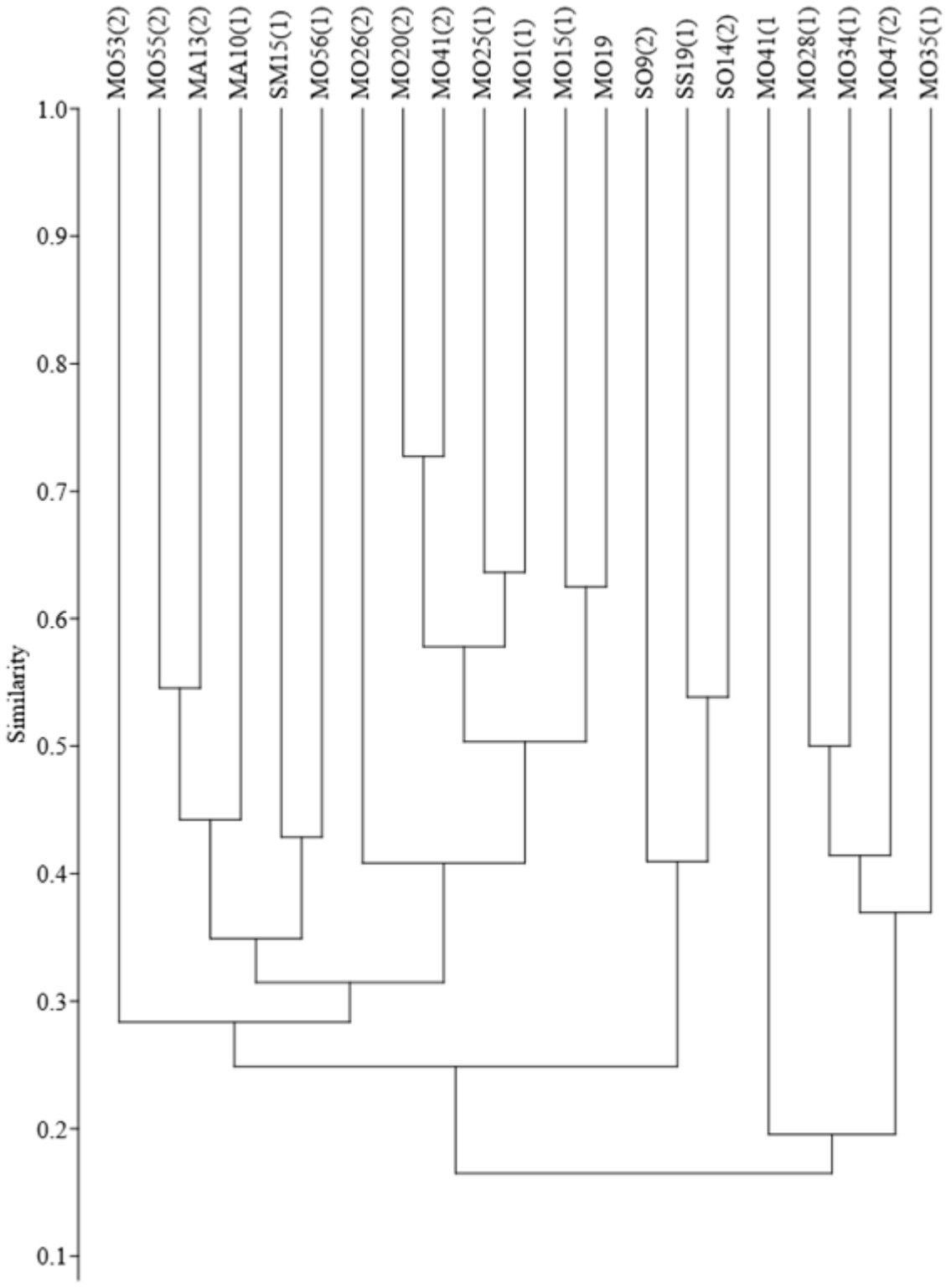
Table S5. Mortality of *M. sativa* cultivars Marina and Etrusca in association with 21 *S. meliloti* in presence of salt. The percentage of harvested death plants of both cultivars are reported for each concentration of sodium chloride tested in symbiosis with each Algerian strains tested. Mean and standard error values are reported.

Table S6. Count of viable cells of *S. meliloti* strains on the *M. sativa* cultivar Marina seed coated with compost. Mean values and standard error of three independent replicate are reported for each strain. Superscript letters indicate results of Tuckey test post-hoc between the *S. meliloti* strains tested.

File S1 (excel). Pairwise comparisons among *S. meliloti* Algerian strains tested in *M. sativa* cultivars Marina and Etrusca For each tested strains and for each growth plant parameters, p-values

of non-parametric Wilcoxon test i) between 0 and 100 mM NaCl and ii) between cultivars are reported.

Supplementary Figures



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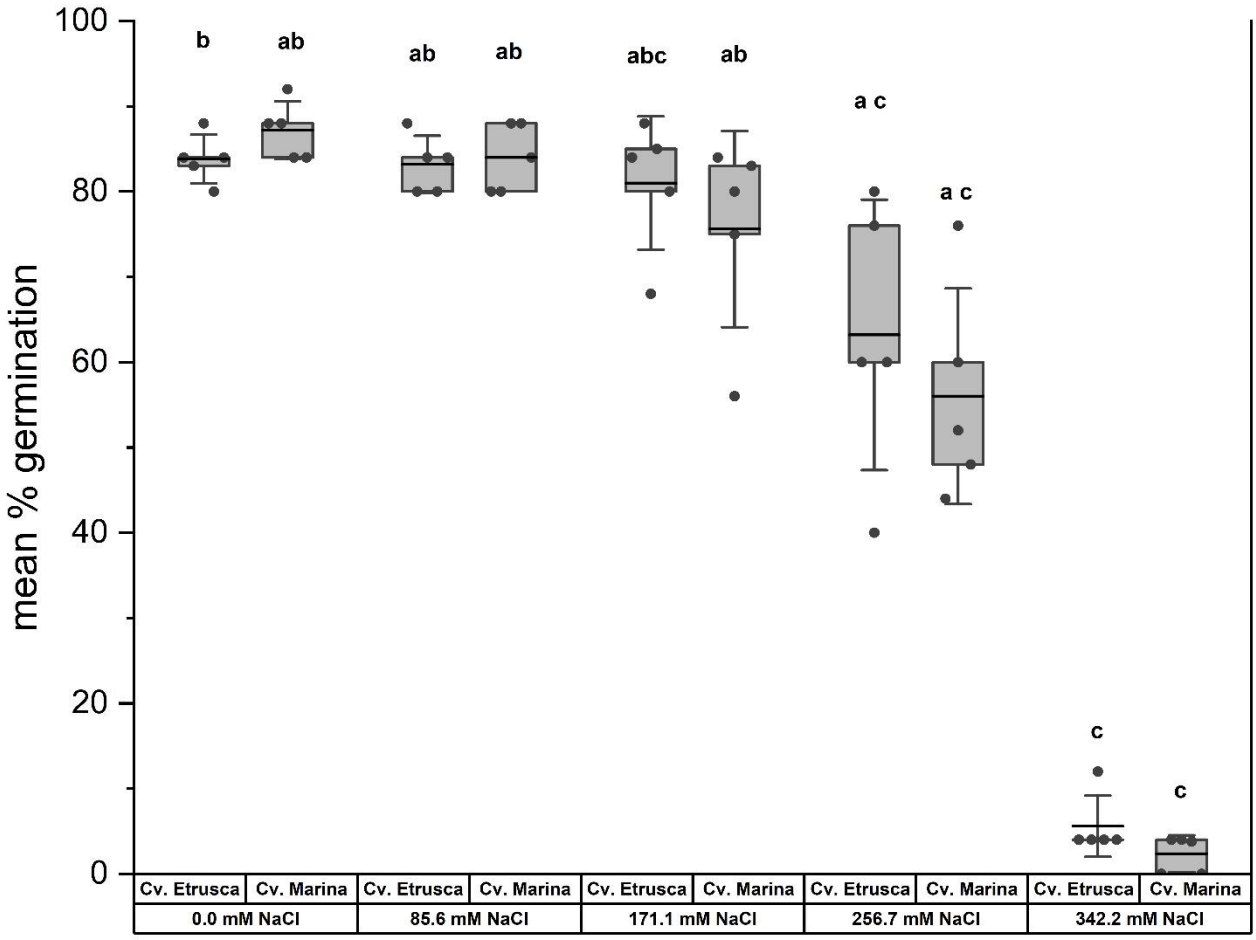

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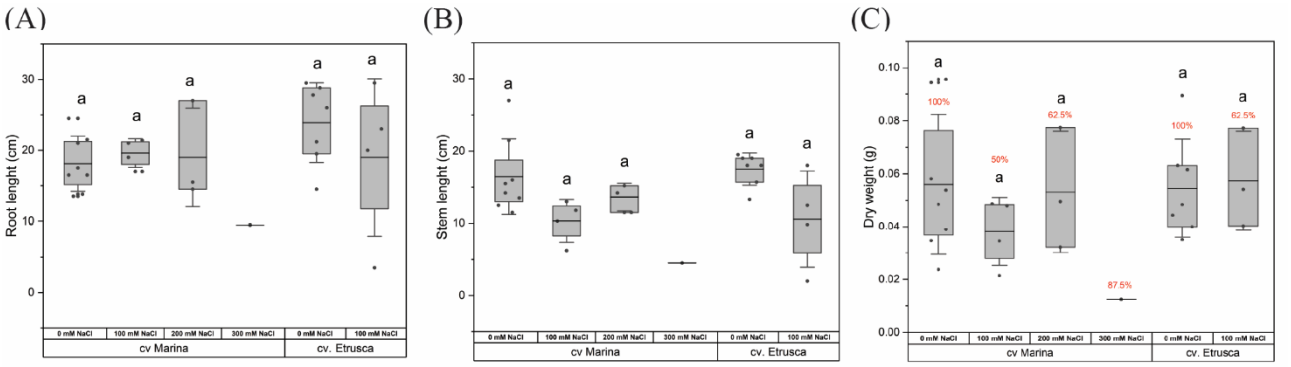

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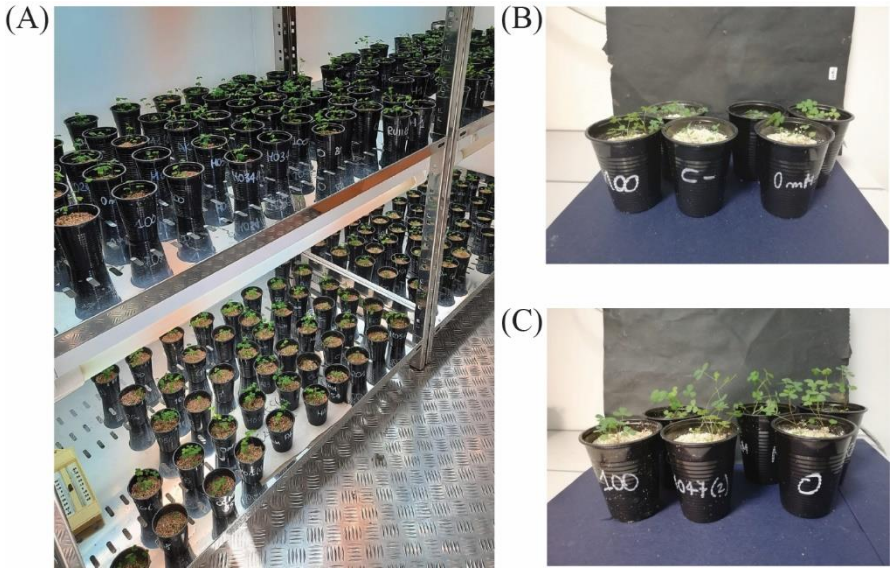

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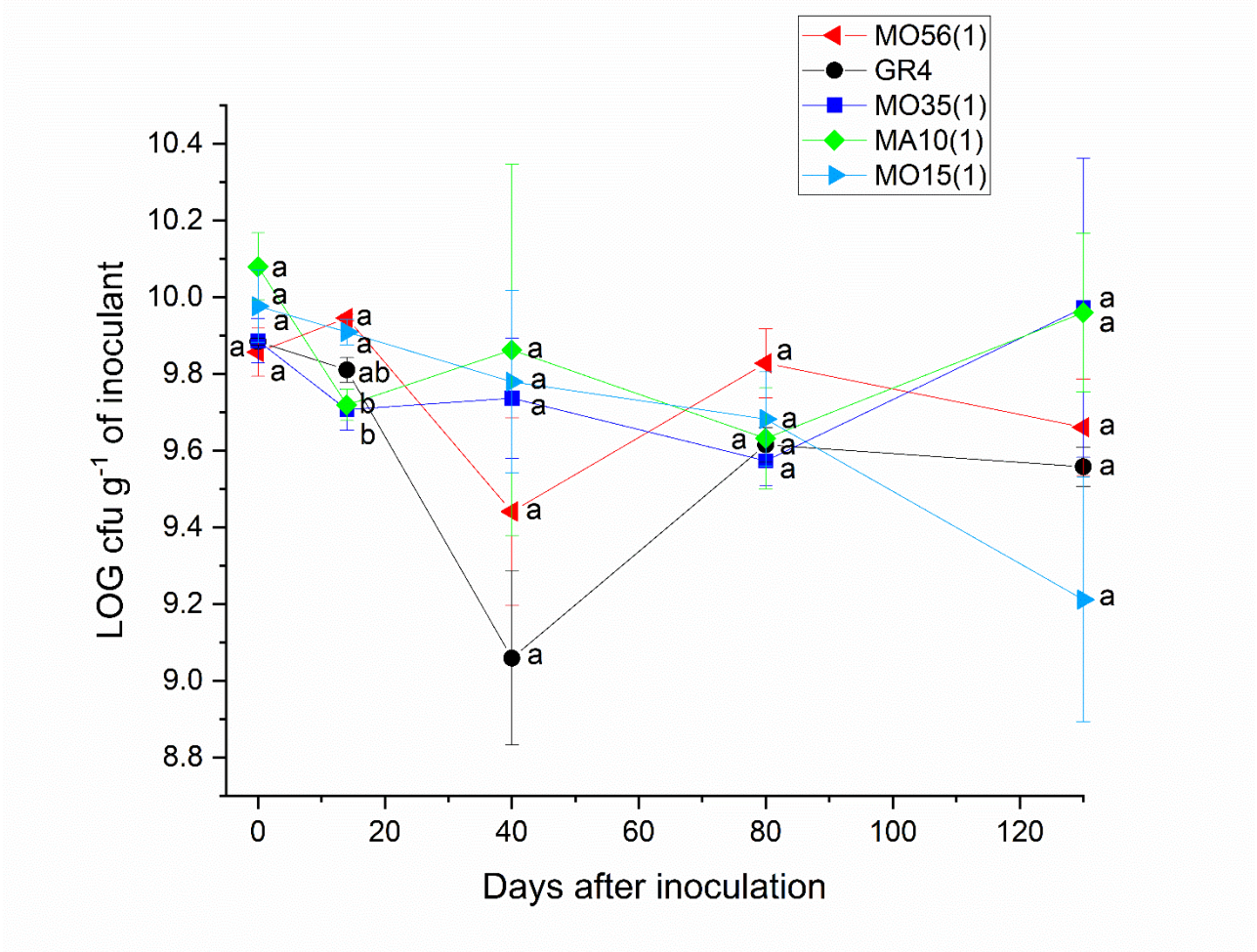

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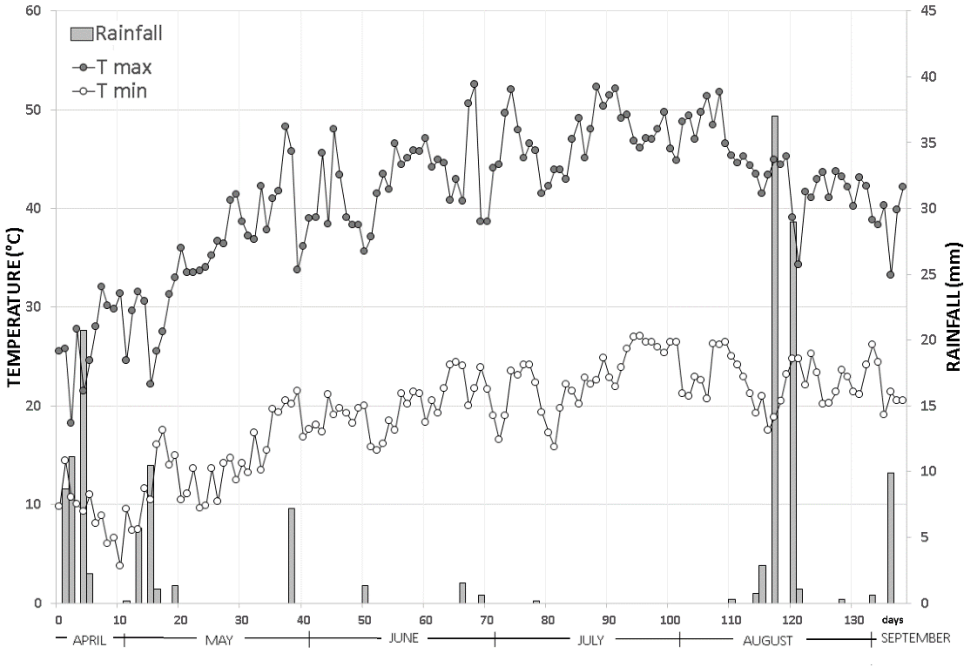

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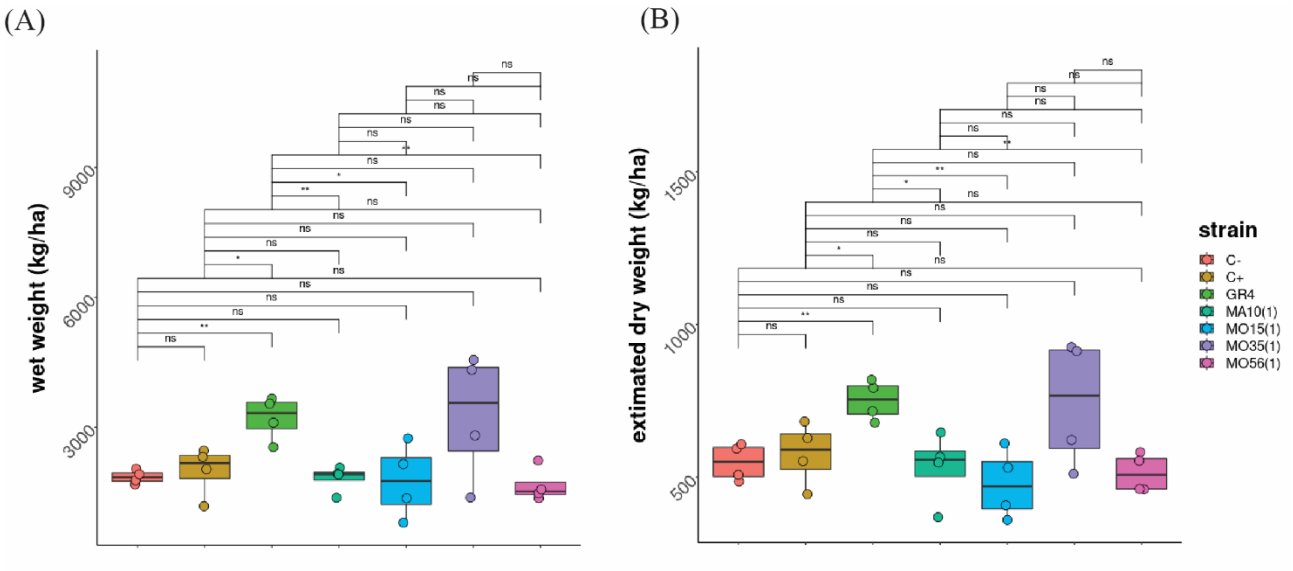

Figure S7. Alfalfa yield with different inoculant treatments in the field trial. Boxplot of wet weight (kg/ha) (A) and estimated dry weight (kg/ha) (B) of different inoculants formulated with *S. meliloti* strains MA10(1), MO35(1), MO15(1), GR4, MO56(1), negative control indicates unfertilized parcels sowed with un-inoculated seeds, positive control indicates fertilized parcels sowed with un-inoculated seeds. Horizontal lines of boxes represent the median, whereas the whiskers represent the maximal and minimal values. Asterisks indicates significant differences based on pairwise comparison between inoculants tested (T-test: ns for not significant, * for $p < 0.05$; ** for $p < 0.01$; *** for $p < 0.001$).

SUPPLEMENTARY TABLES

Table S1. List of *S. meliloti* strains used in this work.

Strain name	Geographical site	Soil salinity level	GenBank accession number for 16S rDNA nucleotide sequence	BlastN Accession number (% identity)
MA10(1)	Fleuris (W. Oran)	Moderately saline	OQ621320	NR_113670 (100%)
MA13(2)	Fleuris (W. Oran)	Moderately saline	OQ621325	NR_113670 (100%)
MO1(1)	Fleuris (W. Oran)	Moderately saline	OQ621319	NR_113670 (100%)
MO15(1)	Fleuris (W. Oran)	Moderately saline	OQ621322	NR_113670 (100%)
MO19	Fleuris (W. Oran)	Moderately saline	OQ621331	NR_113670 (100%)
MO20(2)	Fleuris (W. Oran)	Moderately saline	OQ621335	NR_113670 (99.92%)
MO25(1)	Fleuris (W. Oran)	Moderately saline	OQ621328	NR_113670 (99.92%)
MO26(2)	Fleuris (W. Oran)	Moderately saline	OQ621323	NR_113670 (100%)
MO28(1)	Fleuris (W. Oran)	Moderately saline	OQ621333	NR_113670 (100%)
MO34(1)	Fleuris (W. Oran)	Moderately saline	OQ621327	NR_113670 (100%)
MO35(1)	Fleuris (W. Oran)	Moderately saline	OQ621324	NR_113670 (100%)
MO4(2)	Fleuris (W. Oran)	Moderately saline	OQ621334	NR_113670 (100%)
MO41(1)	Fleuris (W. Oran)	Moderately saline	OQ621338	NR_043399 (99.66%)
MO47(2)	Fleuris (W. Oran)	Moderately saline	OQ621332	NR_113670 (99.92%)
MO53(2)	Fleuris (W. Oran)	Moderately saline	OQ621330	NR_113670 (99.92%)
MO55(2)	Fleuris (W. Oran)	Moderately saline	OQ621339	NR_043399 (99.66%)
MO56(1)	Fleuris (W. Oran)	Moderately saline	OQ621329	NR_113670 (99.92%)
SM15(1)	El Malah (W. d'Ain Témouchent)	Moderately saline	OQ621336	NR_113670 (99.92%)
SO14(2)	Oued Sebbah (W. d'Ain Témouchent))	Saline	OQ621321	NR_113670 (100%)
SO9(2)	Oued Sebbah (W. d'Ain Témouchent)	Saline	OQ621326	NR_113670 (99.92%)
SS19(1)	Es Senia (Oran)	Not saline	OQ621337	NR_113670 (99.92%)

Table S2. Main soil physico-chemical characteristics and count of indigenous nodulating rhizobia of field experiments.

Parameter	Units	Values
Gravel	%	6.3
Sand	%	20.2
Silt	%	46.3
Clay	%	32.9
Texture	-	Clay loam
pH (H_2O)	-	8.3
C.E.C.	mequiv.100 g^{-1}	17.6
Available P_2O_5[a]	mg kg^{-1}	13.4
Organic matter	%	1.5
Total N	g kg^{-1}	1.1
C/N	-	8.0
S, meliloti MPN[b]	cell g^{-1}	2.04 10^5

[a] Olsen method
[b] Most probable number (MPN) of nodulating rhizobia count *per* gram of soil

Table S3. Growth profiles of the rhizobia strains at 100 mM NaCl detected with Biolog Technology. For each replicate, normalized value was calculated as of the ratio of the Arbitrary OmniLog Units (AOU) detected at 100 mM NaCl concentration on the average value of AOU detected at the concentration of 0 mM of related strain. Data were expressed as the average of normalized values.

Strain	Metabolic activity at 0 mM NaCl	Metabolic activity at 100 mM NaCl
MA10(1)	1	0.960
MA13(2)	1	0.980
MO1(1)	1	0.947
MO4(2)	1	0.940
MO15(1)	1	0.957
MO19	1	0.933
MO20(2)	1	0.950
MO25(1)	1	0.947
MO26(2)	1	0.957
MO28(1)	1	0.940
MO34(1)	1	0.940
MO35(1)	1	0.900
MO41(1)	1	0.963
MO47(2)	1	0.920
MO53(2)	1	0.963
MO55(2)	1	0.943
MO56(1)	1	0.957
SM15(1)	1	0.947
SO9(2)	1	0.940
SO14(2)	1	0.963
SS19(1)	1	0.960

Table S4. Tuckey test *post-hoc* outputs on percentage of germination of *M. sativa* cultivars Marina and Etrusca at different NaCl concentrations. Values in tables indicate means of percentage of germination. Different superscript capital letters indicate results of Tuckey test *post-hoc* among levels of salt stress for each cultivar. Different superscript small letters indicate results of Tuckey test between two cultivars for each concentration of NaCl.

Cultivar	C- (0.0 mM NaCl)	0.5% (85.6 mM NaCl)	1.0% (171.1 mM NaCl)	1.5% (256.7 mM NaCl)	2.0% (342.2 mM NaCl)
Marina	87.20 ^{B,a}	84.0 ^{AB,a}	75.66 ^{ABC,a}	56.0 ^{AC,a}	2.36 ^{C,a}
Etrusca	83.86 ^{A,a}	83.2 ^{A,a}	81.04 ^{A,a}	63.2 ^{AB,a}	5.60 ^{B,a}

Table S5. Mortality of *M. sativa* cultivars Marina and Etrusca in association with 21 *S. meliloti* in presence of salt. The percentage of harvested death plants of both cultivars are reported for each concentration of sodium chloride tested in symbiosis with each Algerian strains tested. Mean and standard error values are reported.

	Marina		**Etrusca**	
	0 mM NaCl	**100 mM NaCl**	**0 mM NaCl**	**100 mM NaCl**
Control	0	0	11.1	0
SM15(1)	0	0	22.2	33.3
MO28(1)	0	0	0	11.1
MO53(2)	0	0	11.1	11.1
MO26(2)	0	0	0	11.1
MO56(1)	0	16.7	22.2	66.7
MA10(1)	0	0	0	22.2
MO34(1)	0	16.7	22.2	0
SS19(1)	0	0	0	44.4
MO20(2)	0	0	0	44.4
MO4(2)	0	0	11.1	22.2
MO19	0	0	0	33.3
MO55(2)	0	0	11.1	22.2
SO14(2)	0	0	22.2	66.7
MO1(1)	0	16.7	0	44.4
MO25(1)	0	0	11.1	55.6
MO41(1)	0	16.7	11.1	22.2
MO35(1)	16.7	16.7	0	11.1

SO9(2)	16.7	16.7	22.2	44.4
MO47(2)	0	0	0	22.2
MO15(1)	0	16.7	11.1	55.6
MA13(2)	0	16.7	11.1	55.6
Mean	1.52	6.06	9.09	31.82
Standard error	1.05	1.75	1. 88	4.40

Table S6. Count of viable cells of *S. meliloti* strains on the *M. sativa* cultivar Marina seed coated with compost. Mean values and standard error of three independent replicate are reported for each strain. Superscript letters indicate results of Tuckey test post-hoc between the *S. meliloti* strains tested.

Strains	Mean	Standard error
MO56(1)	$1.56 \times 10^{6\ A}$	2.22×10^{5}
MA10(1)	$1.61\times 10^{6\ A}$	1.47×10^{5}
GR4	$1.50 \times 10^{6\ A}$	2.55×10^{5}
MO15(1)	$1.89 \times 10^{6\ A}$	1.11×10^{5}
MO35(1)	$1.28 \times 10^{7\ A}$	1.47×10^{6}