

Rhizosphere Microbiota Promotes the Growth of Soybeans in a Saline–Alkali Environment under Plastic Film Mulching

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Supplementary Files:

Table S1. Twelve soybean cultivars and field yield information in this study.

Cultivar names		Treatments	
		C	CF
Field yield (g·plant ⁻¹)	wlms82	7.93	14.39
	Hedou13	10.98	21.68
	TZX-805	15.64	23.27
	TZX-1736	12.11	19.97
	TZX-3288	8.63	18.34
	TZX-3736	11.13	22.09
	TZX-3763	6.43	9.94
	TZX-3782	9.02	14.39
	TZX-3873	5.10	7.83
	TZX-773	4.27	8.65
	TZX-3376	6.33	9.29
	TZX-3766	6.04	14.11

Note: C = chemical fertilizer; CF = chemical fertilizer with plastic film mulching.

Table S2. Characteristics of bulk (Dongying) and experimental (Yancheng) soil.

Targets	Unit	Bulk soil		Experimental soil
		C	CF	-
Moisture content	%	13.60 ±0.15	14.36±0.09	8.26±0.05
Electrical conductivity	μs·cm ⁻¹	602.31±36.88	437.19±11.41	506.93±4.93
K ⁺	g·kg ⁻¹	0.05±0.00	0.04±0.00	0.09±0.00
Na ⁺	g·kg ⁻¹	0.72±0.02	0.48±0.01	0.68±0.00

Note: C = chemical fertilizer; CF = chemical fertilizer with plastic film mulching. Values are means ± standard errors. Methods: moisture content was calculated as dry soil weight (soil samples were placed at 105 °C for 12 h) divided by fresh soil weight; Electrical conductivity (soil/water ratio: 1:10) was determined by using an EC meter (FE28, METTLER TOLEDO, Shanghai, China); K Ions and Na Ions were determined by using flame photometry.

Table S3. PERMANOVA results of bacterial and fungal community structures at the OTU level.

Soil compartment	† Main test	Bacteria			Fungi		
		PERMANOVA			PERMANOVA		
		F	R ²	P (>F)	F	R ²	P (>F)
Rhizosphere soil	treatments	8.58	0.08	< 0.01	9.24	0.09	< 0.01

Note: PERMANOVA, permutational multivariate analysis of variance. † Main test represents treatments C (chemical fertilizer) and CF (chemical fertilizer with plastic film mulching). The values in the table represent the pseudo-F ratio (F), the estimation of the variance component (R²) and the level of significance for PERMANOVA.

Table S4. Two-way ANOVA results of the agronomic characteristics of soybean in the greenhouse experiment.

Agronomic characteristics	† Main test	Two-way ANOVA	
		F	<i>P</i> (>F)
Aboveground fresh biomass	treatment 1	5.63	0.028 (*)
	treatment 2	34.01	1.29E-05 (***)
	treatment 1 × treatment 2	3.38	0.08 (NS)

Note: Two-way ANOVA, two-way analysis of variance. † Main tests represent treatment 1 (S: sterilized saline-alkali soil, US: unsterilized saline-alkali soil) and treatment 2 (NF: without plastic film mulching, F: with plastic film mulching). Values in the table represent the pseudo-F ratio (F) and the level of significance for two-way ANOVA.

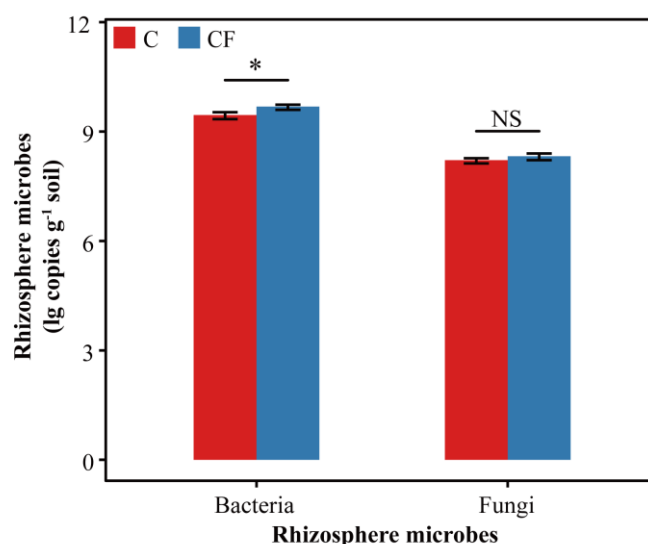


Figure S1. Abundance of total rhizosphere bacteria and fungi based on qPCR.

C = chemical fertilizer, CF = chemical fertilizer with plastic film mulching. qPCR, quantitative polymerase chain reaction. Asterisks above the bars indicate significant differences between the two treatments as determined by Student's t test using 0.05 as the boundary (* = $P < 0.05$, NS = not significant). Values = mean \pm standard error.

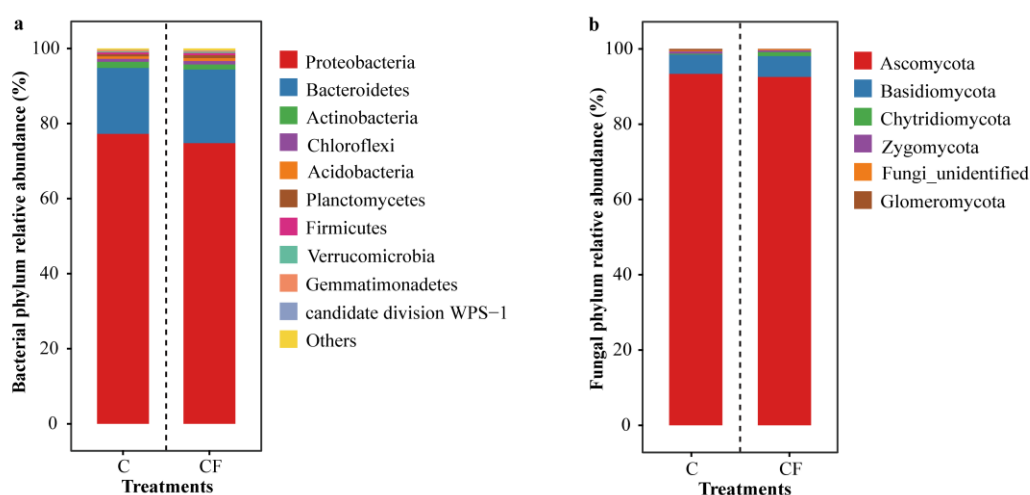


Figure S2. Relative abundances of bacteria (a) and fungi (b) at the phylum level.

C = chemical fertilizer, CF = chemical fertilizer with plastic film mulching.

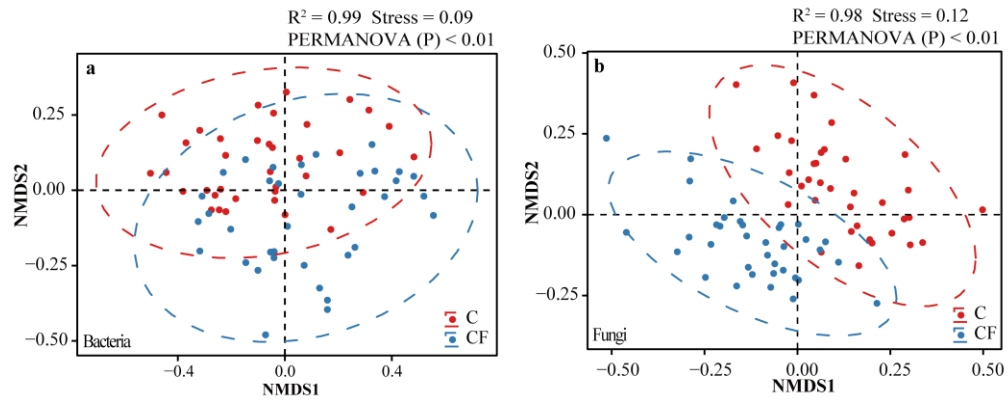


Figure S3. Nonmetric multidimensional scaling (NMDS) of bacterial (a) and fungal (b) community structures based on Bray-Curtis distance.

C = chemical fertilizer, CF = chemical fertilizer with plastic film mulching. PERMANOVA, permutational multivariate analysis of variance. Ellipses cover 95% of the data for each treatment.

