

Planting systems affects soil microbial communities and enzymes activities differentially under drought and phosphorus addition

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Table S1: The interactive effects of planting systems, phosphorus (P) addition and water treatment on the soil chemical properties variables.

Effects	NO ₃ ⁻ -N		DON		DOC		SM		aP	
	F	P	F	P	F	P	F	P	F	P
PS	6.7	0.003	2.4	0.10	12.5	<0.001	0.49	0.61	30.4	<0.001
WT _t	3.2	0.07	8.0	0.007	15.1	<0.001	31.8	<0.001	0.12	0.72
PT _t	0.04	0.83	0.9	0.34	7.1	0.02	0.08	0.77	161.6	<0.001
PS * WT _t	1.9	0.14	7.1	0.002	18.6	<0.001	0.19	0.82	7.6	0.001
PS * PT _t	0.9	0.37	8.7	0.001	38.0	<0.001	0.62	0.53	8.51	0.02
WT _t * PT _t	0.1	0.97	4.3	0.04	11.9	0.001	2.4	0.12	1.9	0.16
PS * WT _t * PT _t	2.1	0.13	0.9	0.38	17.4	<0.001	0.95	0.39	4.1	0.02

Statistically significant ($p < 0.05$) results are shown in boldface (n = 5). PS: planting systems; WT_t: Water treatments and PT_t: Phosphorus addition. SM: soil moisture (%); DOC: dissolved organic carbon (mg/kg); DON: dissolved organic nitrogen (mg/kg); NO₃⁻-N: soil nitrate nitrogen(mg/g) and aP: Available phosphorus (mg P kg⁻¹soil).

Table S2: Summary of three-way ANOVA investigating the effects of planting systems, water treatments, phosphorus addition and their interaction on soil microbial biomass

Effects	MBP		MBN		MBC	
	F	P	F	P	F	P
PS	3.02	0.05	11.8	<0.001	8.8	0.001
WT_t	13.9	0.001	0.02	0.90	14.8	<0.001
PT_t	18.7	<0.001	0.26	0.61	9.7	0.003
PS * WT_s	14.1	<0.001	0.79	0.45	0.93	0.39
PS * PT_t	33.5	<0.001	6.0	0.005	18.8	<0.001
WT_t * PT_t	23.9	<0.001	22.2	<0.001	0.23	0.63
PS * WT_t * PT_t	16.1	<0.001	3.4	0.04	5.6	0.006

Statistically significant ($p < 0.05$) results are shown in boldface ($n = 5$). PS: planting systems; WT_t: Water treatments and PT_t: Phosphorus addition. MBP: microbial biomass phosphorus; MBN: microbial biomass nitrogen and MBC: microbial biomass carbon.

Table S3: Effects of plant systems, water treatments, phosphorus addition and their interaction on microbial community

Parameters		(PS)	(WT _t)	(PT _t)	PS * WT _t	PS * PT _t	WT _t * PT _t	PS * WT _t * PT _t
Total PFLAs	<i>F</i>	53.9	537.6	289.7	35.2	116.1	1297.3	75.0
	<i>P</i>	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bacteria PFLAs	<i>F</i>	52.4	635.5	210.2	44.4	112.2	1037.8	83.3
	<i>P</i>	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
G ⁻ bacteria	<i>F</i>	52.1	248.1	53.3	42.6	73.7	520.3	49.4
	<i>P</i>	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
G ⁺ bacteria	<i>F</i>	4.8	425.3	206.0	4.6	34.3	508.1	31.0
	<i>P</i>	0.011	<0.0001	<0.0001	0.01	<0.0001	<0.0001	<0.0001
Fungi PFLAs	<i>F</i>	20.3	71.7	63.5	1.10	23.6	267.6	9.5
	<i>P</i>	<0.0001	<0.0001	<0.0001	0.34	<0.0001	<0.0001	<0.001
AMF (16:105c)	<i>F</i>	3.8	101.0	66.3	0.7	20.5	217.2	9.4
	<i>P</i>	0.02	<0.0001	<0.0001	0.49	<0.0001	<0.0001	<0.001
F: B ratio	<i>F</i>	3.6	17.2	5.5	1.7	4.1	4.3	3.5
	<i>P</i>	0.3	0.1	0.2	0.35	0.2	0.4	0.3

Significant *P*-values ($p < 0.05$) shown in bold face type. PT_s: planting systems; WT_t: Water treatments and PT_t: Phosphorus addition.

Table S4: Summary of three-way ANOVA investigating the effects of planting systems, water treatments, phosphorus addition and their interaction on soil enzymes activities

Effects	Alkaline phosphate (ug.g-1.h-1)		β -Glucosidase (mg/kg/hr)		urease ($\mu\text{g N-NH}_4 \text{ g}^{-1} \text{ hr}^{-1}$)	
	F	<i>P</i>	F	<i>P</i>	F	<i>P</i>
PS	49.4	<0.001	2.3	0.11	3.9	0.02
WT _t	1.6	0.20	6.6	0.01	13.6	0.001
PT _t	38.3	<0.001	0.83	0.36	10.9	0.002
PS * WT _t	4.8	0.01	9.9	<0.001	23.7	<0.001
PS * PT _t	15.1	<0.001	1.1	0.32	17.2	<0.001
WT _s * PT _t	11.1	0.002	2.3	0.13	22.3	<0.001
PS * WT _t * PT _t	26.7	<0.001	4.2	0.02	19.7	<0.001

Statistically significant ($p < 0.05$) results are shown in boldface ($n = 5$). PS: planting systems; W_t: Water treatments and P_t: Phosphorus addition.