Supplementary material

Table S1. Anosim test performed on the experimental sites using fungi community structure.

Group	R	p-value	q-value
all	0.681424	0.001	-
CK-P4	0.96875	0.035	0.0525
CK-P5	0.989583	0.035	0.0525
CK-P6	0.979167	0.025	0.0525
P4-P5	0.395833	0.06	0.0720
P4-P6	0.59375	0.021	0.0525
P5-P6	0.34375	0.142	0.1420

CK, P4, P5 and P6 indicate unmodified soda saline-alkali paddy fields and modification by phosphogypsum for 4, 5, and 6 years, respectively.

Table S2. Redundancy analysis and permutation test performed on the experimental sites using fungi community structure.

	RDA1	RDA2	r2	Pr(>r)
SWC	0.788398268	-0.615165157	0.024245549	0.861
EC	-0.425099064	0.905146831	0.286724747	0.131
pH	-0.999314868	-0.037010733	0.313035007	0.073
TOC	0.867554523	-0.497342084	0.446774765	0.015
OM	0.867554524	-0.497342084	0.446774766	0.015
TN	0.879566119	-0.475776673	0.414062883	0.029
TP	0.980656058	0.195738848	0.252957242	0.165
TK	0.177939326	0.984041461	0.257925418	0.127
AP	0.920199208	0.391450402	0.180003393	0.261
NH_4-N	0.94897699	-0.315345323	0.23954274	0.163
ENa	-0.820850464	0.571143165	0.29637946	0.100
CEC	0.769233692	0.638967548	0.01067639	0.900
ESP%	-0.80491436	0.593390995	0.37508473	0.048
HCO_3^-	-0.999987942	0.004910846	0.347656101	0.06
Cl^-	-0.762598723	0.646871849	0.189673174	0.198
SO_4^{2-}	0.630756008	0.775981223	0.34089335	0.056
Na^+	-0.729789025	0.683672421	0.375505905	0.046
Mg^{2+}	-0.915774431	-0.401692907	0.377411409	0.076
K^+	-0.930774296	-0.365594324	0.371021604	0.065
Ca^{2+}	-0.99958482	-0.028812962	0.329848931	0.081

SWC, soil water content; EC, electric conductivity; TC, total carbon; TOC, total organic carbon; SOM, soil organic matter; TN, total nitrogen; TP, total phosphorus; TK, total potassium; AP, available phosphorus; AK, available potassium; NH_4-N, nitrate; NO_3-N, ammonium; ENA, exchangeable sodium ion; CEC, cation exchange capacity; ESP, soil alkalinity.

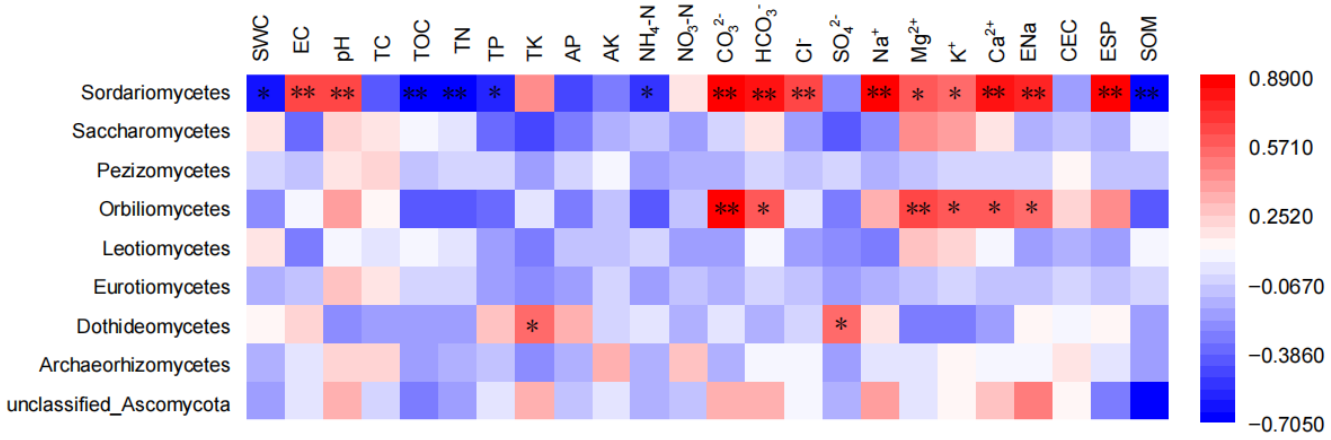

Figure S1. Pearson correlation analysis between the relative abundance of fungi at the Ascomycetes subphylum level and environmental factors (soil physicochemical characteristics and soil ions content). Correlation coefficients are colored from dark red (positive correlation) to dark blue (negative correlation). Color intensity is proportional to the correlation coefficients. SWC, soil water content; pH, potential of hydrogen; EC, electric conductivity; TC, total carbon; TOC, total organic carbon; SOM, soil organic matter; TN, total nitrogen; TP, total phosphorus; TK, total potassium; AP, available phosphorus; AK, available potassium; NH_4-N, nitrate; NO_3-N, ammonium; ENa, exchangeable sodium ion; CEC, cation exchange capacity; ESP, soil alkalinity. *, $P < 0.05$; **, $P < 0.01$.