

Table S1 The effect of agricultural practices (AP) and plant growth stages (S) on soil carbon and microbial diversity index

Factors		η^2					
		TOC	AOC	DOC	MBC	B_Obs	F_Obs
Rhizosphere	AP	0.71 **	0.51 **	0.85 **	0.83 **	0.41 *	0.88 **
	S	ns	0.45 **	0.98 **	0.87 **	0.91 **	0.87 **
	AP×S	ns	ns	0.93 **	ns	0.50 *	0.64 **
Bulk	AP	0.47 **	0.71 **	ns	0.72 **	ns	0.74 **
	S	ns	0.49 **	ns	0.70 **	0.73 **	0.41 *
	CP×S	ns	0.46 *	0.44 *	0.44 *	ns	0.41 *

The significance level, ns: not significant; *: $p < 0.05$; **: $p < 0.01$. η^2 describes the percentage of variance explained in the dependent variable by a predictor variable. AP: agricultural practices (C, CS, R and RS); S: plant growth stages (V10, VT and R4). C: continuous maize cropping without straw retention; CS: continuous maize cropping with straw mulching; R: maize-peanut rotation without straw retention; RS: maize-peanut rotation with straw mulching; V10: the tenth leaf stage; VT: tassel stage; R4: dough stage; TOC: total organic carbon; AOC: active organic carbon; DOC: dissolved organic carbon; MBC: microbial biomass carbon; B_Obs: observed bacterial species; F_Obs: observed fungal species.

Table S2 The ecological guilds of the fungal genera predicted by FUNGUild

Taxon	Trophic Mode	Guild
<i>Cylindrocarpon</i>	Pathotroph	Plant Pathogen
<i>Gibberella</i>	Pathotroph	Plant Pathogen
<i>Ilyonectria</i>	Pathotroph	Plant Pathogen
<i>Leptosphaeria</i>	Pathotroph	Plant Pathogen
<i>Mycosphaerella</i>	Pathotroph	Plant Pathogen
<i>Penicillium</i>	Pathotroph	Animal Pathogen
<i>Didymella</i>	Pathotroph-Saprotroph	Animal Pathogen-Plant Pathogen-Undefined Saprotroph
<i>Exophiala</i>	Pathotroph-Saprotroph	Animal Pathogen-Undefined Saprotroph
<i>Paraphoma</i>	Pathotroph-Saprotroph	Fungal Parasite-Plant Pathogen-Plant Saprotroph
<i>Setophoma</i>	Pathotroph-Saprotroph	Fungal Parasite-Plant Pathogen-Plant Saprotroph
<i>Torula</i>	Pathotroph-Saprotroph	Endophyte-Plant Pathogen-Wood Saprotroph
<i>Acremonium</i>	Pathotroph-Saprotroph-Symbiotroph	Animal Pathogen-Endophyte-Fungal Parasite-Plant Pathogen-Wood Saprotroph
<i>Alternaria</i>	Pathotroph-Saprotroph-Symbiotroph	Animal Pathogen-Endophyte-Plant Pathogen-Wood Saprotroph
<i>Fusarium</i>	Pathotroph-Saprotroph-	Animal Pathogen-Endophyte-

	Symbiotroph	Lichen Parasite-Plant Pathogen- Soil Saprotroph-Wood Saprotroph
<i>Plectosphaerella</i>	Pathotroph-Saprotroph- Symbiotroph	Plant Pathogen
<i>Microdochium</i>	Pathotroph-Symbiotroph	Endophyte-Plant Pathogen
<i>Botryotrichum</i>	Saprotroph	Undefined Saprotroph
<i>Chaetomidium</i>	Saprotroph	Dung Saprotroph-Undefined Saprotroph
<i>Myrmecridium</i>	Saprotroph	Undefined Saprotroph
<i>Neosetophoma</i>	Saprotroph	Undefined Saprotroph
<i>Preussia</i>	Saprotroph	Undefined Saprotroph
<i>Pseudaleuria</i>	Saprotroph	Undefined Saprotroph
<i>Pseudogymnoascus</i>	Saprotroph	Plant Saprotroph-Wood Saprotroph
<i>Schizothecium</i>	Saprotroph	Undefined Saprotroph
<i>Tausonia</i>	Saprotroph	Undefined Saprotroph
<i>Thelebolus</i>	Saprotroph	Dung Saprotroph
<i>Helotiaceae</i>	Saprotroph-Symbiotroph	Ectomycorrhizal-Fungal Parasite- Plant Pathogen-Wood Saprotroph
<i>Mortierella</i>	Saprotroph-Symbiotroph	Endophyte-Litter Saprotroph- Soil Saprotroph-Undefined Saprotroph
<i>Monodictys</i>	-	-
<i>Solicoccozyma</i>	-	-
<i>Dokmaia</i>	-	-

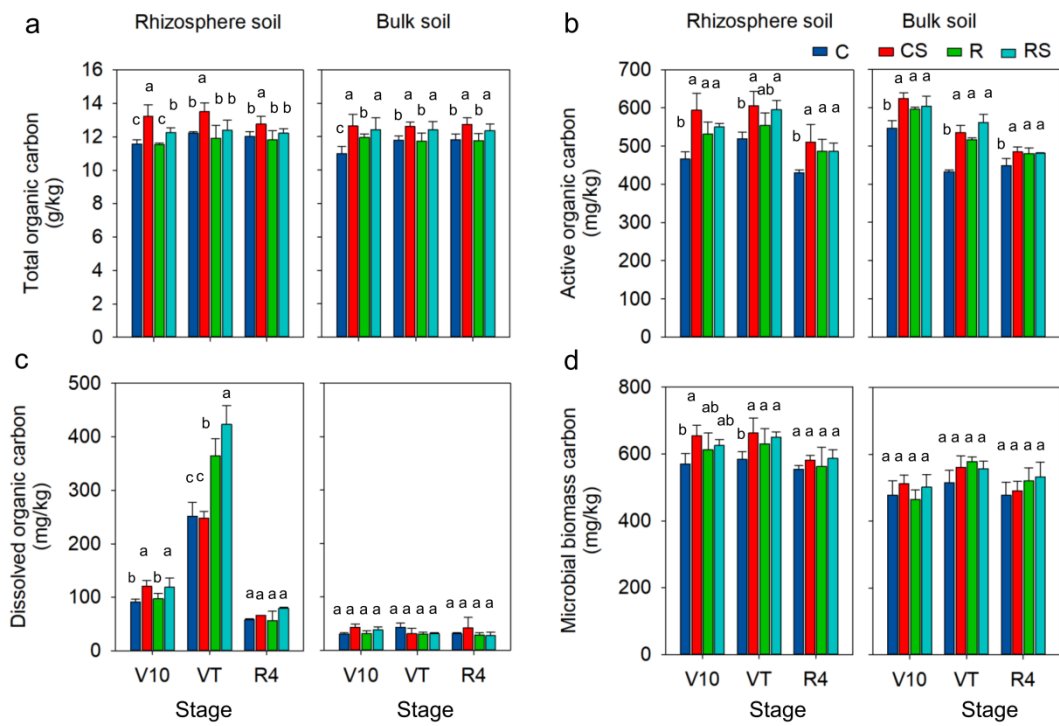


Fig.S1 Total organic carbon (a), active organic carbon (b), dissolved organic carbon (c) and microbial biomass carbon (d) in the four agricultural practices at three growth stages. Error bars indicate the standard deviation of three replicates. Different letters indicate significant differences ($P < 0.05$) between treatments at each growth stage.

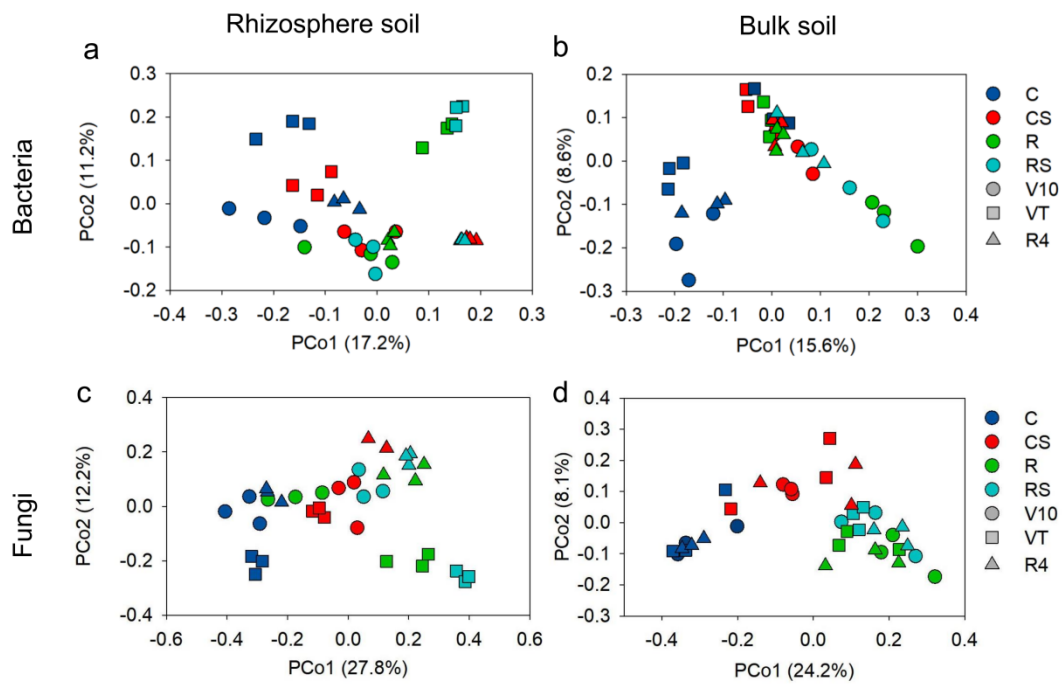


Fig.S2 PCoA of the bacteria community in rhizosphere soil (a) and bulk soil (b); PCoA of the fungi community in rhizosphere soil (c) and bulk soil (d). C: continuous maize cropping without straw retention; CS: continuous maize cropping with straw mulching; R: maize-peanut rotation without straw retention; RS: maize-peanut rotation with straw mulching; V10: the tenth leaf stage; VT: tassel stage; R4: dough stage.