

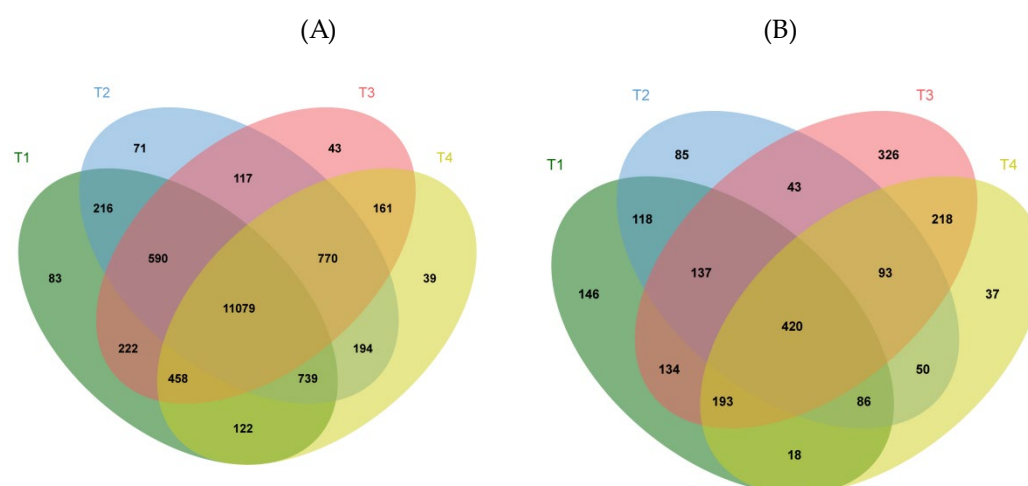
**Figure S1: Four different management fields**

(A) was treatment 1 (T1), grow watermelons for four years and then leave them fallow for three years

(B) was treatment 2 (T2), grow watermelons for seven years.

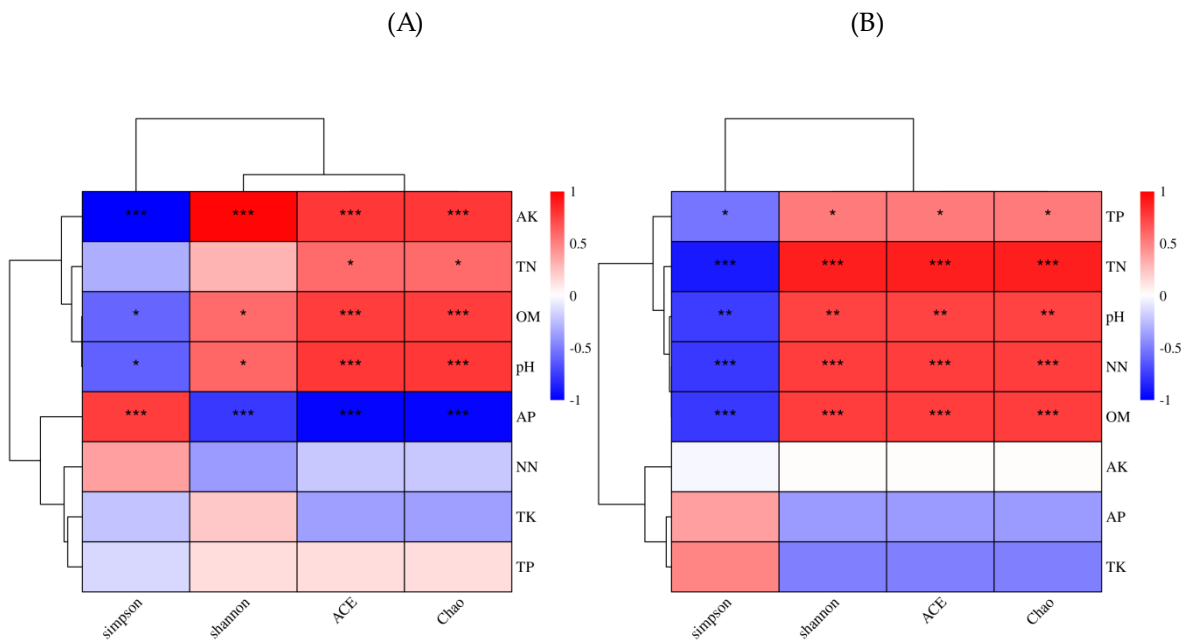
(C) was treatment 3 (T3), grow watermelons for six years and wheat for one year.

(D) was treatment 4 (T4), grow one year watermelon and one sunflower crop rotate,  $n=9$ .



**Figure S2. Venn diagram of soil bacterial (A) and fungal (B) OTUs.**

Related to Figure 1A and B. (T1: grow watermelons for four years and then leave them fallow for three years, T2: grow watermelons for seven years, T3: grow watermelon for six years and wheat for one year, T4: one year watermelon and one sunflower crop rotate, n=9).



**Figure S3.** Spearman correlations of alpha diversity in soil bacterial (A) and fungal (B) community to soil attributes.

**Table S1. Soil bacterial and fungal community composition at the phylum level.** (T1: grow watermelons for four years and then leave them fallow for three years, T2: grow watermelons for seven years, T3: grow watermelon for six years and wheat for one year, T4: one year watermelon and one sunflower crop rotate, n=9).

Kingdom	Phylum	Relative abundance %					
		T1	T2	T3	T4	F	P
Bacteria	Proteobacteria	0.102±0.0082b	0.189±0.0184a	0.154±0.0147a	0.181±0.00705a	9.241	<b>0.000</b>
	Verrucomicrobia	0.0071±0.00091	0.0186±0.00674	0.0167±0.00248	0.0096±0.00111	2.265	0.100
	Planctomycetes	0.115±0.011	0.130±0.009	0.126±0.009	0.107±0.009	1.224	0.317
	Gemmatimonadetes	0.02±0.003a	0.01±0.001b	0.011±0.001b	0.011±0.001b	6.618	<b>0.001</b>
	Actinobacteria	0.261±0.015a	0.109±0.014b	0.126±0.009b	0.127±0.021b	21.750	<b>0.000</b>
	Euryarchaeota	0.004±0.002	0.002±0.000	0.005±0.003	0.002±0.001	0.654	0.586
	Bacteroidetes	0.009±0.002	0.011±0.003	0.009±0.001	0.008±0.001	0.558	0.647
	Acidobacteria	0.178±0.009b	0.206±0.011a	0.223±0.008a	0.224±0.008a	5.267	<b>0.005</b>
	Others	0.304±0.008	0.324±0.021	0.327±0.008	0.33±0.011	0.805	0.500
	Total	100%	100%	100%	100%		
Fungi	Mortierellomycota	0.002±0.001	0.029±0.019	0.004±0.001	0.002±0.002	1.944	0.142
	Ascomycota	0.725±0.044a	0.427±0.121b	0.594±0.061ab	0.359±0.114b	3.259	<b>0.034</b>
	Glomeromycota	0.014±0.005	0.009±0.005	0.027±0.008	0.012±0.006	1.769	0.173
	Chytridiomycota	0.116±0.066	0.032±0.029	0.003±0.002	0.027±0.016	1.783	0.170
	Basidiomycota	0.012±0.004	0.046±0.023	0.073±0.024	0.032±0.012	2.140	0.115
	Others	0.131±0.032b	0.457±0.126a	0.3±0.058ab	0.567±0.126a	4.011	<b>0.016</b>
	Total	100%	100%	100%	100%		