

Table S1. Effective tags from the soil samples derived after organic amendment in both time points.

Sample Name	Total Tag	Taxon Tag	Unclassified Tag	Unique Tag	OUT Number
CK1.1	79996	79244	64	688	885
CK1.2	91236	89740	207	1289	1329
CK1.3	76735	76016	51	668	963
M1.1	94229	93423	116	690	718
M1.2	96238	95267	148	823	802
M1.3	91194	90114	133	947	795
MS1.1	88943	88011	113	819	800
MS1.2	91626	90722	86	818	838
MS1.3	92354	91430	83	841	921
S1.1	74746	73526	135	1085	980
S1.2	80655	79803	35	817	872
S1.3	84936	83895	81	960	866
CK2.1	73621	72527	201	893	874
CK2.2	67801	66836	105	860	953
CK2.3	82660	81878	35	747	955
M2.1	72088	70876	53	1159	762
M2.2	77409	73995	1199	2215	997
M2.3	53551	52877	112	562	595
MS2.1	69819	68972	49	798	798
MS2.2	74984	74083	153	748	779
MS2.3	67536	67090	33	413	558
S2.1	63847	62923	40	884	652
S2.2	74058	72989	57	1012	758
S3.3	77386	75956	98	1332	906

Statistics of the operational taxonomic units (OTU) clusters and species annotation of every replication of treatment. Total Tag indicates the number of total effective tags. Unique Tag indicates the total number of singletons which were removed for further analysis from the dataset. Taxon Tag displays the total number of tags which were subjected to OTU clusters along species annotation. Unclassified Tag represents the total number of tags without species annotation. OTU number show the number of OTUs for each replication of treatment. CK1.1, CK1.2, and CK1.3: control soil at 50 days; M1.1, M1.2, and M1.3: goat manure treated soil at 50 days; MS1.1, MS1.2, and MS1.3: goat manure plus sugarcane straw treated soil at 50 days; S1.1, S1.2, and S1.3: sugarcane straw treated soil at 50 days. CK2.1, CK2.2, and CK2.3: control soil at 100 days; M2.1, M2.2, and M2.3: goat manure treated soil at 100 days; MS2.1, MS2.2, and MS2.3: goat manure plus sugarcane straw treated soil at 100 days; S1.1, S1.2 and S1.3: sugarcane straw treated soil at 100 days.

Table S2. Composition of different fungal phyla in soil samples derived after different organic amendments at both time points.

	CK1	M1	MS1	S1	CK2	M2	MS2	S2
<i>Ascomycota</i>	22.7±3.5 e	83.7±0.3 ab	90.9±0.5 a	79.9±0.3 bc	52.6±1.3 d	71.2±9.4 c	92.9±0.7 a	59.9±1.9 d
<i>Zygomycota</i>	72.7±4.2 a	10.4±0.2 cd	5.9±0.4 de	16.4±0.2 c	39.6±1.6 b	13.0±4.6 c	3.2±0.5 e	14.1±0.5 c
<i>Basidiomycota</i>	3.2±0.5 cd	4.8±0.5 bc	1.5±0.1 d	1.8±0.2 d	6.9±0.5 b	5.1±1.4 bc	1.9±0.1 d	23.7±1.3 a
<i>Chytridiomycota</i>	0.9±0.2 b	0.5±0.0 b	0.7±0.1 b	1.3±0.1 b	0.4±0.1 b	9.4±3.2 a	1.7±0.2 b	1.9±0.9 b
<i>Glomeromycota</i>	0.4±0.1 bc	0.5±0.0 bc	0.9±0.1 a	0.6±0.0 bc	0.4±0.0 bc	0.7±0.2 ab	0.3±0.1 c	0.4±0.0 bc
Others	0.1±0.1 ab	0.1±0.0 ab	0.1±0.0 b	0.1±0.0 b	0.2±0.1 ab	0.6±0.5 a	0.1±0.1 b	0.1±0.0 b

Different letters are showing a significant difference ($p=0.05$) among treated soil with control soil. CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days.

Table S3. Top fungi with high relative abundance at genus level in the soil samples.

	CK1	M1	MS1	S1	CK2	M2	MS2	S2
<i>Podospora</i>	0.88±0.22 c	50.42±0.78 a	48.65±1.04 a	1.28±0.06 c	1.24±0.21 c	27.25±14.76 b	61.46±2.11 a	1.13±0.34 c
<i>Microidium</i>	0.53±0.10 b	0.22±0.04 b	0.15±0.01 b	2.84±0.67 b	26.02±5.34 a	2.15±1.08 b	0.29±0.05 b	0.05±0.01 b
<i>Zopfiella</i>	0.84±0.23 cd	0.83±0.02 cd	2.22±0.18 bc	31.88±1.30 a	0.37±0.08 d	0.24±0.04 d	0.35±0.02 d	2.91±0.06 b
<i>Mortierella</i>	3.51±0.04 b	0.83±0.02 b	0.23±0.02 b	0.73±0.05 b	1.51±0.24 b	8.82±3.89 a	0.63±0.19 b	0.53±0.06 b
<i>Lophodermium</i>	0.12±0.03 bc	11.54±1.35 a	1.54±0.15 b	0.09±0.01 bc	0.00±0.00 c	0.43±0.21 bc	0.02±0.00 c	0.01±0.01 c
<i>Fusarium</i>	1.71±0.42 b	0.15±0.00 b	0.26±0.04 b	0.34±0.01 b	7.85±1.66 a	1.23±0.51 b	0.71±0.23 b	1.09±0.18 b
<i>Gibellulopsis</i>	5.39±0.57 a	0.04±0.00 b	0.03±0.01 b	0.04±0.00 b	0.02±0.00 b	0.10±0.05 b	0.02±0.01 b	0.00±0.00 b
<i>Cercophora</i>	0.25±0.06 d	2.33±0.31 b	2.83±0.16 ab	0.82±0.04 cd	0.33±0.07 cd	4.10±1.34 a	1.74±0.18 bc	0.41±0.05 cd
<i>Remispora</i>	0.02±0.01 c	0.12±0.01 c	0.03±0.01 c	0.16±0.02 c	0.12±0.02 c	3.32±1.25 b	4.71±0.27 a	0.12±0.02 c
Others	86.58±0.50 a	33.52±0.30 de	44.08±0.58 cd	61.83±0.67 b	58.32±3.18 b	52.34±9.70 bc	30.02±1.82 e	93.70±0.65 a

Highly abundant fungi at genus level in the soil samples. CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days. Different letters are showing a significant difference ($p=0.05$) among treated soil with control soil.

Table S4. Variation in fungal function under organic amended soils at different time points.

	CK1	M1	MS1	S1	CK2	M2	MS2	S2
Pathotroph	8.0±0.6 c	11.0±0.6 b	7.3±0.3 c	14.0±0.6 a	15.0±1.7 a	8.7±0.3 c	4.0±0.0 d	7.7±0.3 c
Saprotroph	55.0±2.9 bc	44.3±3.8 d	50.3±2.0 cd	61.7±3.8 b	52.0±1.7 bcd	49.0±2.3 cd	58.3±0.9 bc	78.7±6.6 a
Symbiotroph	19.3±2.0 ab	16.0±0.6 cd	17.0±0.6 bc	5.0±0.0 f	12.3±0.3 e	13.7±0.3 de	20.0±1.2 a	5.3±0.3 f
Other	8.0±0.0 d	15.6±0.9 a	14.5±1.7 ab	4.7±0.1 e	10.8±0.5 c	6.7±0.3 de	12.2±0.9 bc	4.4±0.1 e
Undefined	9.6±0.3 d	13.1±1.0 bc	10.9±1.1 cd	14.3±1.0 b	10.0±0.6 d	21.7±1.0 a	5.7±0.1 e	4.2±0.2 e

CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days. Different letters are showing a significant difference ($p=0.05$) among treated soil with control soil.

Table S5. Shift in Structure of fungal functional groups (guilds) inferred by FUNGuild at two different time points.

	CK1	M1	MS1	S1	CK2	M2	MS2	S2
Animal Pathogen	0.7±0.1 f	1.9±0.1 de	3.3±0.1 c	10.1±0.2 a	1.7±0.2 e	2.4±0.2 d	2.1±0.0 de	5.5±0.4 b
Plant Pathogen	7.3±0.6 c	9.3±0.2 b	3.9±0.2 d	4.1±0.4 d	13.1±1.5 a	6.0±0.3 c	1.9±0.1 e	2.0±0.1 e
Dung Saprotroph	1.8±0.1 e	18.3±1.9 bc	22.0±0.0 b	34.7±2.5 a	2.0±0.1 e	14.5±0.4 d	19.9±0.3 bc	16.5±1.6 cd
Plant Saprotroph	0.2±0.0 b	0.7±0.0 b	1.4±0.1 b	0.3±0.0 b	0.4±0.0 b	0.7±0.1 b	0.9±0.1 b	11.7±1.3 a
Soil Saprotroph	3.2±0.1 c	0.4±0.0 e	0.3±0.0 e	4.1±0.2 b	4.7±0.2 a	2.6±0.2 d	0.6±0.0 e	2.6±0.1 d
Undefined Saprotroph	27.8±0.5 a	8.7±0.1 d	11.2±0.9 cd	15.3±1.0 b	29.4±1.1 a	15.5±1.3 b	12.3±0.4 c	15.6±1.6 b
Wood Saprotroph	21.9±2.4 b	16.2±1.9 c	15.6±0.9 c	7.2±0.3 d	15.7±0.2 c	16.0±0.4 c	24.7±0.4 b	32.2±1.9 a
Arbuscular Mycorrhizal	0.4±0.0 de	0.5±0.0 cd	0.9±0.1 a	0.6±0.1 bc	0.4±0.0 de	0.7±0.1 b	0.3±0.0 e	0.4±0.1 cd
Ectomycorrhizal	0.1±0.0 d	0.1±0.0 d	0.2±0.0 d	0.1±0.0 d	0.2±0.0 d	1.3±0.1 a	1.1±0.1 b	0.3±0.0 c
Endophyte	18.4±1.8 a	15.3±0.7 b	15.9±0.5 b	4.3±0.0 d	11.5±0.3 c	11.1±0.1 c	17.2±0.9 ab	4.5±0.2 d
Lichenized	0.6±0.0 c	0.0±0.0 e	0.1±0.0 e	0.2±0.0 de	0.2±0.0 d	0.8±0.0 b	1.1±0.1 a	0.1±0.0 de
Other	8.0±0.0 d	15.6±0.9 a	14.5±1.7 ab	4.7±0.1 e	10.8±0.5 c	6.7±0.3 de	12.2±0.9 bc	4.4±0.1 e
Undefined	9.6±0.3 d	13.1±1.0 bc	10.9±1.1 cd	14.3±1.0 b	10.0±0.6 d	21.7±1.0 a	5.7±0.1 e	4.2±0.2 e

CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days. Different letters are showing a significant difference ($p=0.05$) among treated soil with control soil.

Table S6. Physiochemical characteristics of the soil.

Treatments	pH	AP	TP	AK	TN	AN	NH ₄ ⁺	NO ₃ ⁻	TC	C/N
Units		g/kg	g/kg	mg/kg	g/kg	mg/kg	mg/kg	mg/kg	g/kg	
First time										
CK1	5.64 ± 0.01 ^f	0.09 ± 0.00 ^e	0.70 ± 0.07 ^{bc}	71.85 ± 3.140 ^e	1.12 ± 0.07 ^f	113.05 ± 1.01 ^{cd}	2.79 ± 0.13 ^d	21.85 ± 1.10 ^b	9.96 ± 0.10 ^g	8.95 ± 0.660 ^e
M1	5.72 ± 0.03 ^e	0.20 ± 0.00 ^c	0.88 ± 0.08 ^b	865.92 ± 3.02 ^c	2.50 ± 0.02 ^c	307.30 ± 2.02 ^a	9.49 ± 0.52 ^a	29.46 ± 0.37 ^a	32.71 ± 0.36 ^c	13.09 ± 0.22 ^a
MS1	7.51 ± 0.01 ^b	0.25 ± 0.01 ^b	1.27 ± 0.04 ^a	1008.41 ± 6.18 ^b	2.29 ± 0.02 ^d	207.55 ± 9.09 ^b	9.79 ± 0.26 ^a	20.16 ± 0.12 ^{bc}	27.32 ± 0.07 ^d	11.91 ± 0.06 ^b
S1	6.10 ± 0.02 ^d	0.10 ± 0.00 ^d	0.71 ± 0.00 ^{bc}	151.46 ± 18.09 ^d	1.11 ± 0.01 ^f	113.05 ± 5.05 ^{cd}	5.90 ± 0.09 ^c	19.53 ± 0.49 ^{bc}	12.69 ± 0.03 ^f	11.47 ± 0.09 ^{bc}
Second time										
CK2	5.73 ± 0.02 ^e	0.09 ± 0.00 ^{de}	0.61 ± 0.01 ^c	65.73 ± 6.28 ^e	0.93 ± 0.01 ^g	79.80 ± 4.040 ^d	2.10 ± 0.05 ^d	18.89 ± 0.36 ^{bc}	10.16 ± 0.06 ^g	10.89 ± 0.08 ^{cd}
M2	6.80 ± 0.02 ^c	0.39 ± 0.00 ^a	1.34 ± 0.07 ^a	1138.21 ± 3.09 ^a	4.59 ± 0.02 ^a	327.25 ± 5.46 ^a	6.90 ± 0.33 ^{bc}	32.41 ± 0.12 ^a	47.50 ± 1.00 ^a	10.35 ± 0.19 ^d
MS2	7.61 ± 0.02 ^a	0.25 ± 0.00 ^b	1.42 ± 0.11 ^a	980.61 ± 3.03 ^b	3.17 ± 0.11 ^b	222.95 ± 15.16 ^b	7.71 ± 0.12 ^b	21.00 ± 0.85 ^{bc}	36.70 ± 1.26 ^b	11.59 ± 0.02 ^{bc}
S2	6.15 ± 0.02 ^d	0.09 ± 0.00 ^{de}	0.75 ± 0.04 ^{bc}	129.03 ± 6.13 ^d	1.31 ± 0.01 ^e	136.50 ± 5.66 ^c	6.18 ± 1.00 ^c	18.05 ± 0.12 ^c	16.67 ± 0.09 ^e	12.72 ± 0.10 ^a

Different letters are showing a significant difference ($p=0.05$) among treated soil with control soil. CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days.

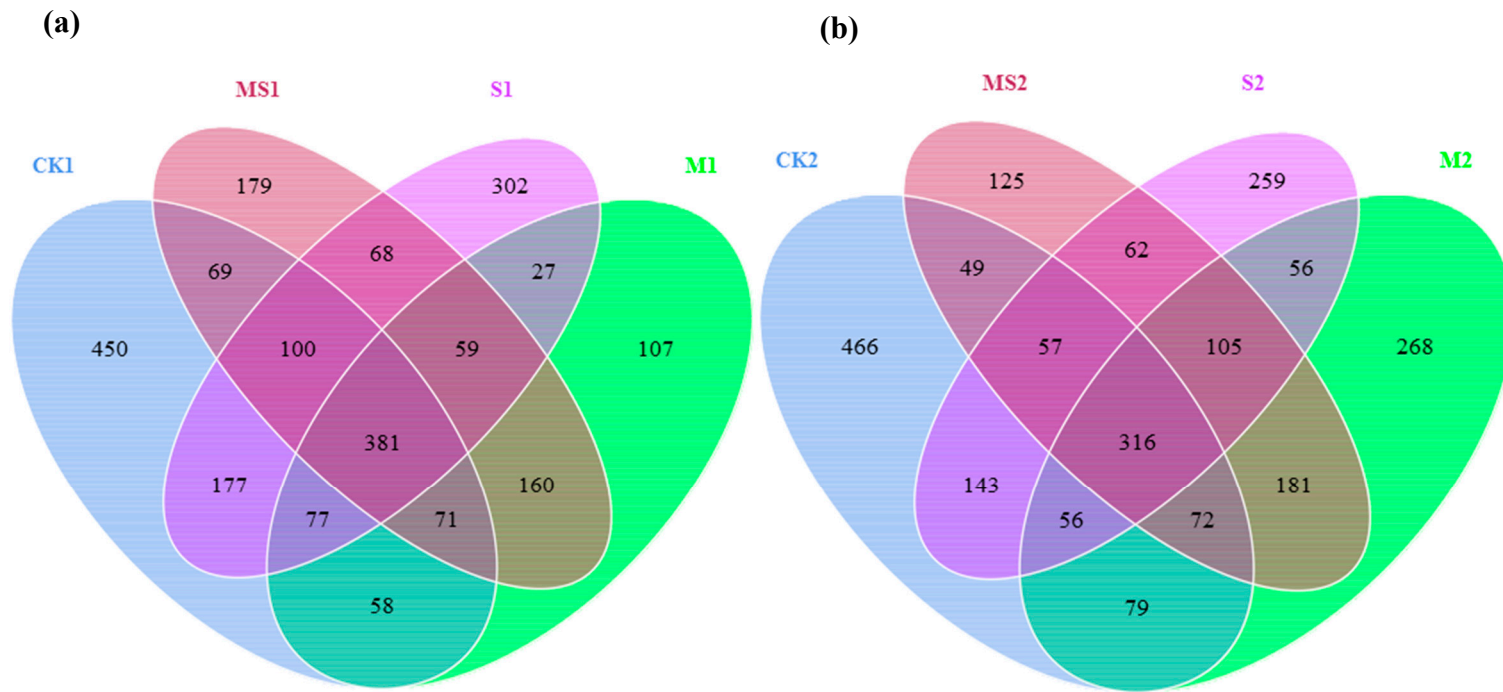


Figure S1. Venn diagram for soil samples at two time points. CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days.

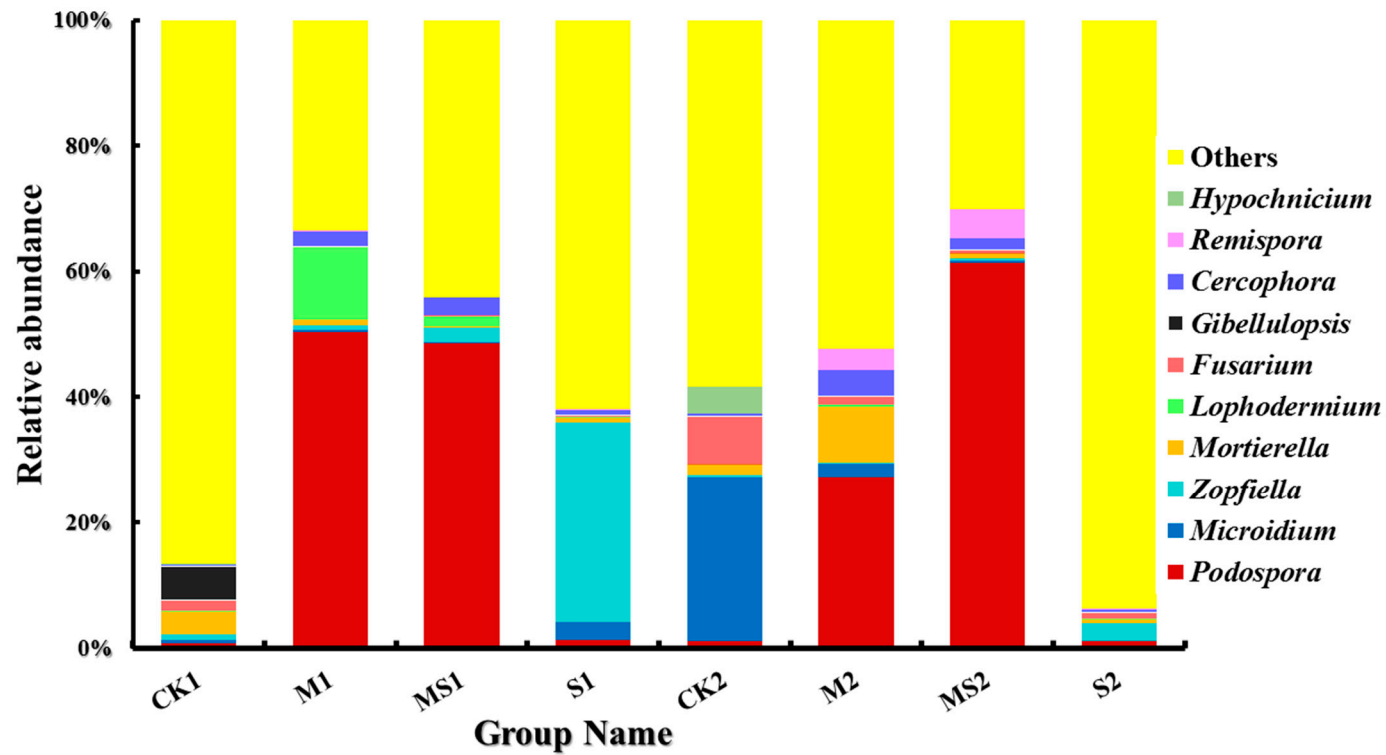


Figure S2. Top 10 Fungi with high relative abundance at genus level in the soil samples. CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days.

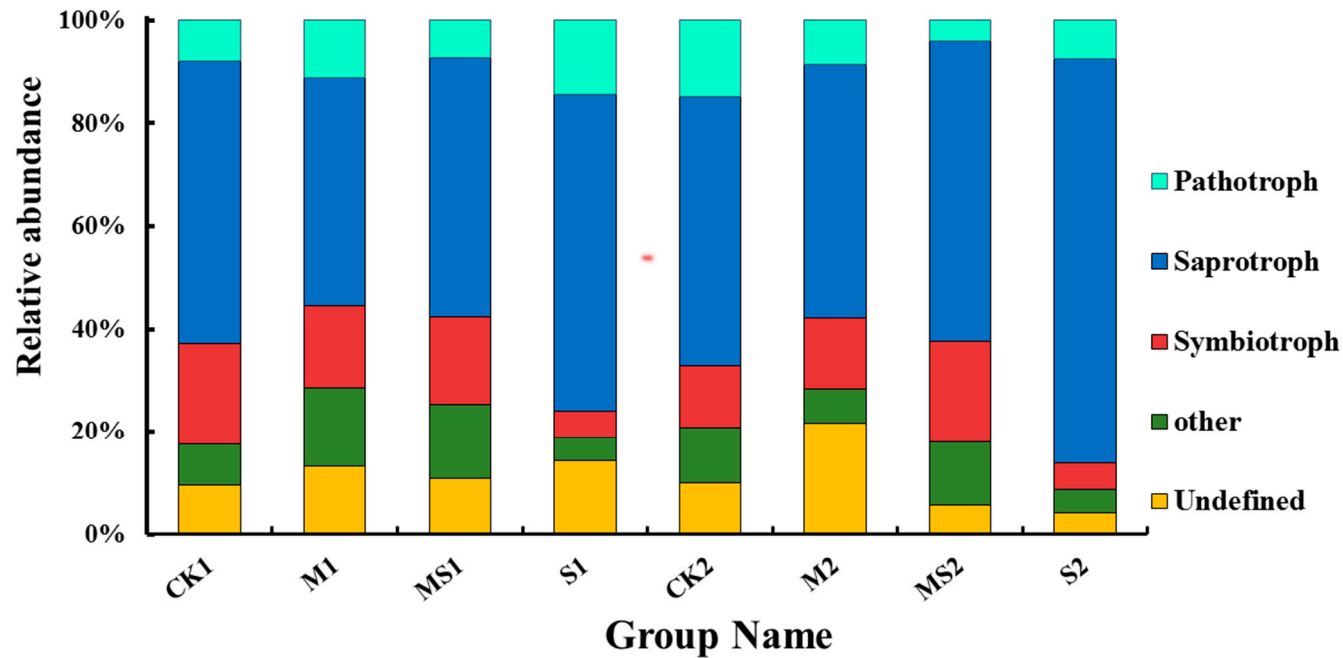


Figure S3. Variation in fungal function at different time points. CK1: control soil at 50 days; M1: goat manure amended soil at 50 days; MS1: goat manure plus sugarcane straw amended soil at 50 days; S1: sugarcane straw amended soil at 50 days. CK2: control soil at 100 days; M2: goat manure amended soil at 100 days; MS2: goat manure plus sugarcane straw amended soil at 100 days; S2: sugarcane straw amended soil at 100 days.