

Supplementary Information

Contrasting diversity and network dynamics of soil fungal functional groups in the plant rhizosphere

The following supporting information is available for this article:

Fig. S1 Daily temperatures and precipitation at the study area in 2021 and 2022.

Fig. S2 Rarefaction shows that the sequencing effort captured the majority of the fungal richness.

Fig. S3 The community structure and dispersion of soil fungal functional groups in the rhizosphere.

Fig. S4 The composition of major taxonomical ranks of soil fungal functional groups in the rhizosphere.

Table S1 Study site information.

Table S2 Fungal functional groups.

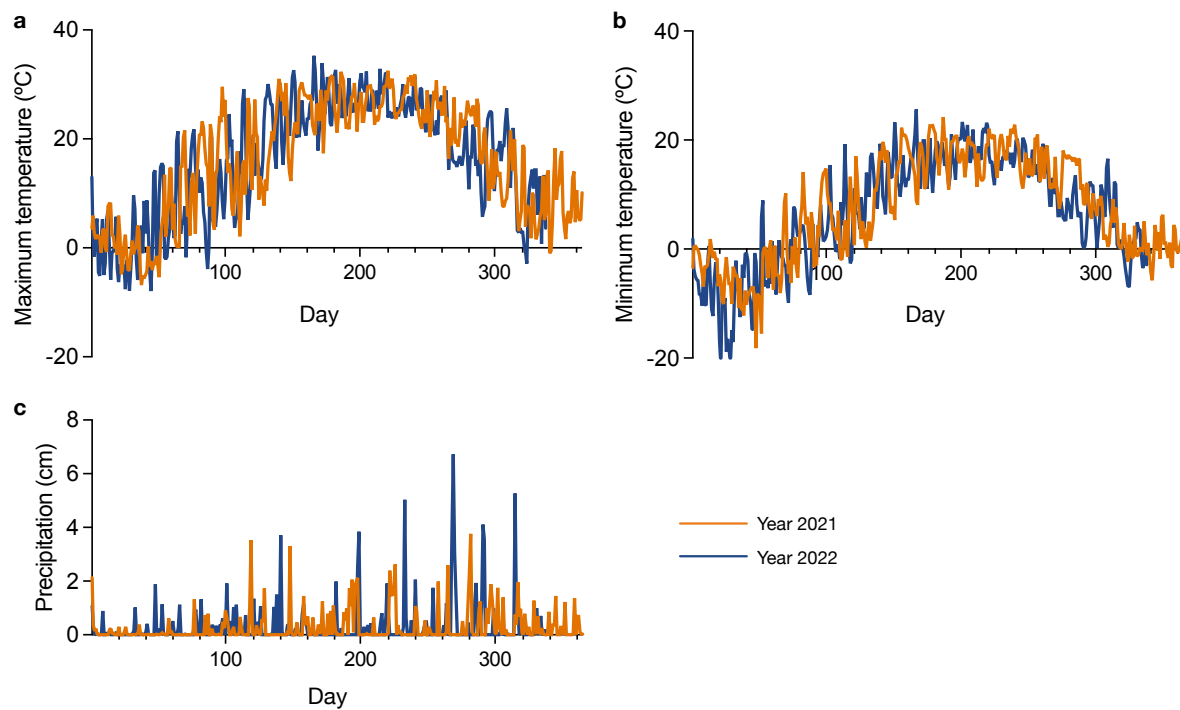


Fig. S1 Daily temperatures and precipitation at the study area in 2021 and 2022. The data were accessed from Perry Station (41.7603 N, -81.1411W) via the CFAES Weather System of the Ohio State University (<https://weather.cfaes.osu.edu/>).

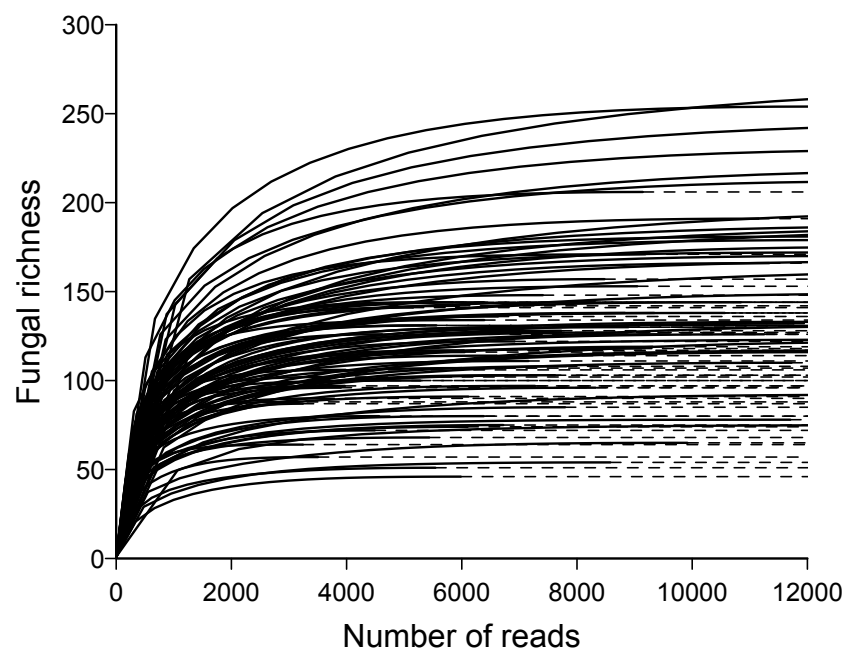


Fig. S2 Rarefaction shows that the sequencing effort captured the majority of the fungal richness. The number of sequencing reads (x -axis) each sample is represented by the solid portion of each line, whereas the dashed portion indicates extrapolation in the rarefaction analysis using the R package iNEXT.

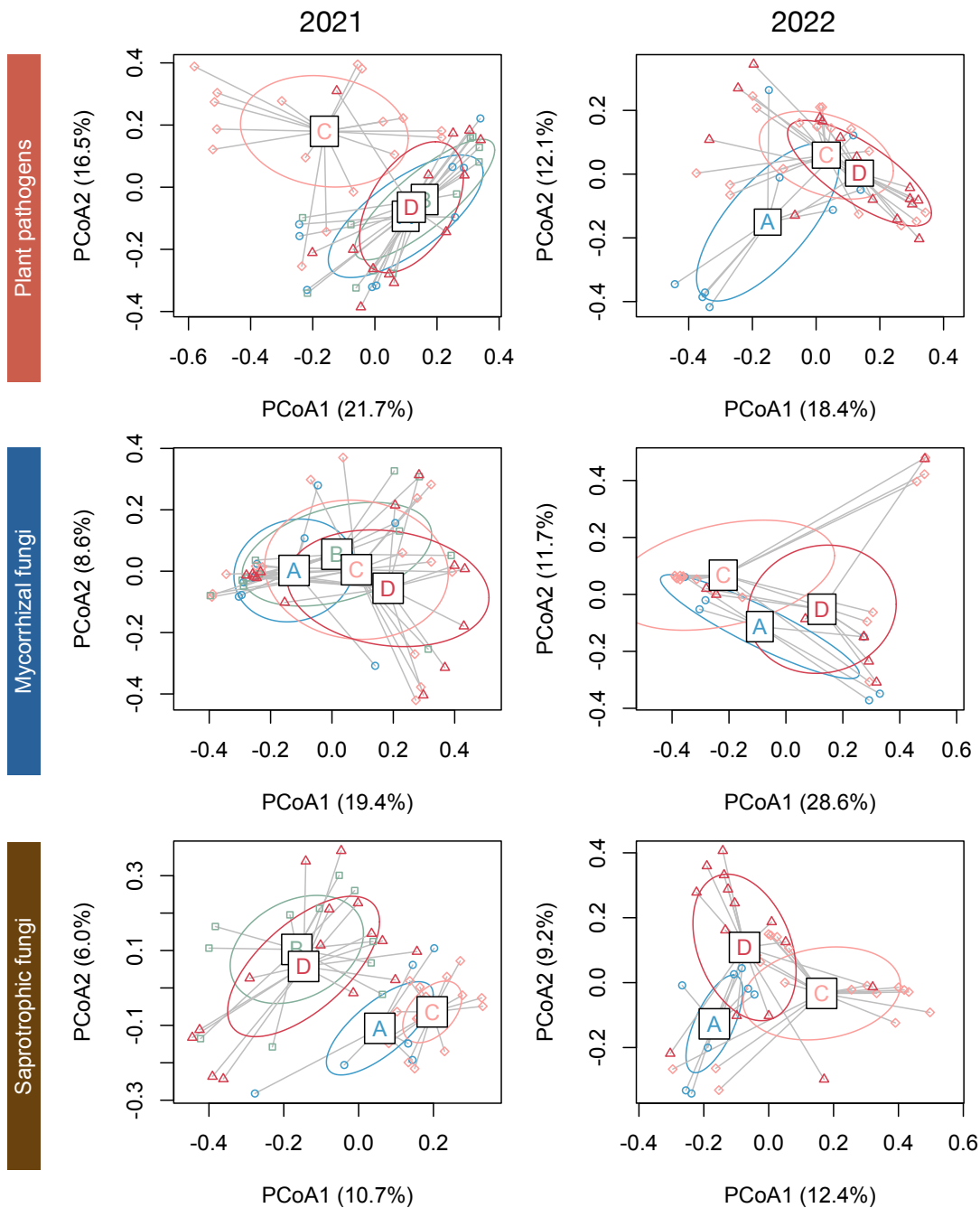


Fig. S3 Community structure and dispersion of soil fungal functional groups in the rhizosphere across four fields: field A (planted in 2019), field B (2018), field C (2017) and field D (2016). Field B was removed by the farm in 2022. Tests for multivariate dispersion showed no significant differences among field (all $P > 0.05$; see Fig. 3), suggesting that observed differences in community structure was primarily driven by mean differences among fields. Standard deviation (1 SD) ellipses were plotted using the R package *vegan*.

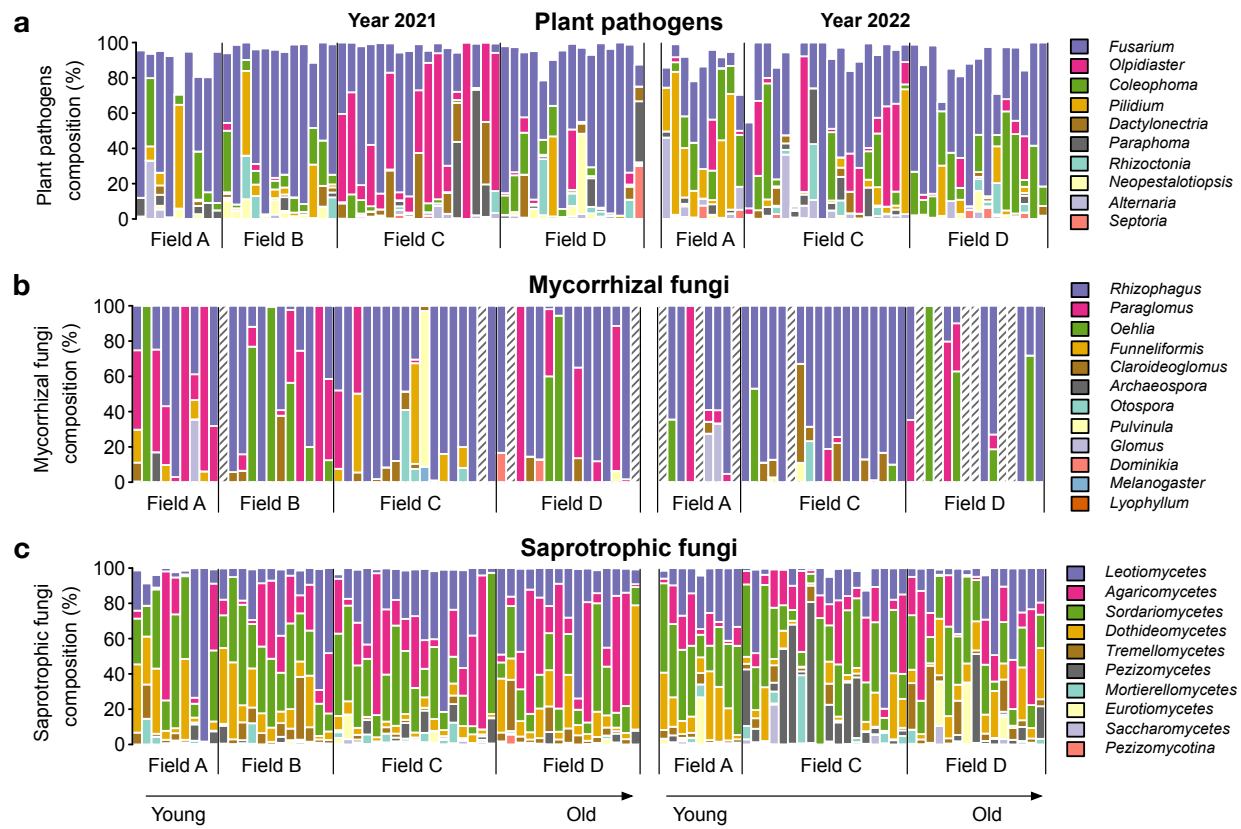


Fig. S4 The composition of major taxonomical ranks of soil fungal functional groups in the rhizosphere. (a) The top 10 most abundant genera of putative plant pathogenic fungi, (b) all 12 genera of mycorrhizal fungi, and (c) the top 10 most abundant classes of saprotrophic fungi are shown across fields of different ages in 2021 and 2022. Hatched bars indicate the absence of mycorrhizal fungi, especially in older fields and in 2022. Field B was removed by the farm in 2022.

Table S1 Study site information

Field	Planted year	Genotype						
A	2019	AC Valley Sunset	Allstar	-	-	-	Wendy	
B	2018	AC Valley Sunset	Allstar	-	-	Earliglow	Wendy	
C	2017	AC Valley Sunset	Allstar	DaRoyal	DarSelect	Earliglow	Wendy	
D	2016	AC Valley Sunset	Allstar	DaRoyal	DarSelect	-	Wendy	

Table S2 Fungal functional groups

Functional group	Number of ASVs	% of ASVs
Plant pathogenic fungi	108	5%
Saprotrophic fungi	644	29%
Mycorrhizal fungi	136 (130 AM + 6 EcM)	6%
Plant endophytes	24	1%
Parasites	99	4%
Animal endosymbionts	1	0%
Unassigned	1227	55%
Total ASVs	2239	

AM: Arbuscular mycorrhiza; EcM: ectomycorrhizae