Supplementary Information

Network complexity of rubber plantations is lower than tropical forests for soil bacteria but not fungi

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Figure S1 Rainforest (solid blue hexagons) and rubber plantation (solid red triangles) study sites on Hainan Island.

Figure S2 Relationship between network properties and OTU abundance of rubber plantations and tropical rainforest sites across season. The size of the node indicates the OTU abundance.

Figure S3 Z_i-P_i plot showing the topological distribution of OTUs in the bacterial networks. Each point represents a fungal OTU. Threshold values of Z_i and Pi for the classification are 2.5 and 0.62, respectively. The size of the node indicates the OTU abundance.

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Figure S5 Network degree of soil bacterial and fungal community of rubber plantations (blue) and tropical rainforest (red) in dry season and rainy season (A: bacteria in dry season, B: bacteria in rainy season, C: fungal in dry season, D: fungal in rainy season)

Figure S6 Phylum composition of the soil fungal community of rubber plantations and tropical rainforest sites across seasons.

Figure S7 Phylum composition of the soil bacterial community of rubber plantations and tropical rainforest sites across seasons.

Table S1 Site characteristics for rubber plantations and tropical rainforest sites.

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Table S4 Keystone fungal taxa in the overall network. Keystones were selected on the basis of high degree, high closeness centrality and low betweenness centrality (for dry season: cut-off: degree >25 and CC >0.25 and BC < 0.06, for rainy season: cut-off: degree >30 and CC >0.32 and BC <0.040) according to Berry and Widder (2014).

Table S1 Site characteristics for rubber plantations and tropical rainforest sites.

Forest type	Site	Longitude	Latitude	Elevation（m）	Mean annual precipitation (mm)	Mean annual temperature (℃)
Rubber plantation	Danzhou (DZ)	109.5789	19.5628	112	1831.53	23.60
Rubber plantation	Qiongzhong (QZ)	109.7387	19.2633	156	2067.33	23.45
Rubber plantation	Ledong (LD)	109.2231	18.7534	170	1661.26	24.46
Rubber plantation	Wanning (WN)	110.132	18.6749	51	1786.46	24.7
Rubber plantation	Haikou (HK)	110.5723	19.6977	102	1863.38	24.16
Rainforest	Diaoluo (DL)	109.864	18.7277	958	1921.27	24.17
Rainforest	Jianfeng (JF)	108.8834	18.7273	950	1392.34	24.69
Rainforest	Bawang (BW)	109.1277	19.0842	575	1602.12	24.31
Rainforest	Yingge (YG)	109.5598	19.0467	620	2067.77	23.55
Rainforest	Wuzhi (WZ)	109.6812	18.9059	820	2173.82	23.42

Table S2 Soil properties and environmental factors for rubber plantation and tropical rainforest study sites on Hainan Island.

Vegetation type	WC (%)	SOM (%)	Soil pH	AN (mg/kg)	NN (mg/kg)	AP (mg/kg)	AK (g/kg)	TN (g/kg)	TP (g/kg)	TK (g/kg)	Elevation (m)	Rainfall (mm)	Temperature (℃)
Rubber plantation	29.20±9.77	1.56+0.88	4.79±0.44	12.39±6.03	7.59±4.31	4.03± 3.34	29.37±15.35	1.28±0.65	0.30±0.37	13.09±11.24	118.20±42.42	1841.99±132.49	24.07±0.48
Rainforest	31.63±9.79	2.92±0.90	4.59±0.59	15.31±5.49	13.01±6.75	4.13±3.72	78.58±39.67	2.08±0.94	0.18±0.13	15.69±7.80	784.60±161.68	1831.46±293.21	24.03±0.48

Table S3 Keystone bacterial taxa in the overall network. Keystones were selected on the basis of high degree, high closeness centrality and low betweenness centrality (for dry season: cut-off: degree >45 and CC >0.42 and BC <0.030, for rainy season: cut-off: degree >72 and CC >0.45 and BC <0.020) according to Berry and Widder (2014).

Forest systems	Season	OTU ID	Abundance	Genus	Phylum	Betweenness Centrality	Closeness Centrality	Degree
Rubber	Dry							
		OTU7157	4249	norank_o__Acidimicrobiales	Actinobacteria	0.029	0.441	50
		OTU12862	2526	norank_c__TK10	Chloroflexi	0.019	0.443	48
		OTU11199	5405	norank_o__Acidimicrobiales	Actinobacteria	0.025	0.439	47
Rainforest	Dry							
		OTU11388	3403	norank_c__Acidobacteria	Acidobacteria	0.030	0.448	50
		OTU13452	3618	Isosphaera	Planctomycetes	0.028	0.422	50
		OTU11373	50724	norank_c__Acidobacteria	Acidobacteria	0.017	0.424	47
		OTU12812	17787	Mycobacterium	Actinobacteria	0.028	0.423	47
		OTU12831	1892	norank_f__Planctomycetaceae	Planctomycetes	0.019	0.422	47
Rubber	Rainy							
		OTU12588	2428	Iamia	Actinobacteria	0.018	0.498	78
		OTU7139	1714	norank_f__Nitrosomonadaceae	Proteobacteria	0.012	0.488	76
		OTU8355	15140	norank_f__Nitrosomonadaceae	Proteobacteria	0.008	0.485	73
Tropical	Rainy							
		OTU11373	45930	norank_c__Acidobacteria	Acidobacteria	0.019	0.510	88
		OTU11421	5437	Candidatus_Xiphinematobacter	Verrucomicrobia	0.011	0.504	79
		OTU2626	26970	norank_c__Acidobacteria	Acidobacteria	0.012	0.497	78
		OTU12996	8087	Candidatus_Xiphinematobacter	Proteobacteria	0.011	0.501	77
		OTU8228	6839	norank_c__Acidobacteria	Acidobacteria	0.011	0.492	77
		OTU2133	3464	H16	Proteobacteria	0.016	0.513	76
		OTU11388	3390	norank_c__Acidobacteria	Acidobacteria	0.018	0.508	75

Table S4 Keystone fungal taxa in the overall network. Keystones were selected on the basis of high degree, high closeness centrality and low betweenness centrality (for dry season: cut-off: degree >25 and CC >0.25 and BC < 0.06, for rainy season: cut-off: degree >30 and CC >0.32 and BC <0.040) according to Berry and Widder (2014).

Forest systems	Season	OTU ID	Abundance	Genus	Phylum	Betweenness Centrality	Closeness Centrality	Degree
Rubber	Dry							
		OTU1965	9341	Clitopilus	Basidiomycota	0.060	0.290	32
		OTU2200	6757	unclassified	unclassified	0.052	0.289	28
Rainforest	Dry							
		OTU7656	4373	unclassified_f__Thelephoraceae	Basidiomycota;	0.048	0.306	26
Rubber	Rainy							
		OTU5009	2362	unclassified	unclassified	0.022	0.323	31
		OTU4781	3421	Mortierella	Zygomycota	0.1417	0.354	30
		OTU5180	1719	unclassified_p__Ascomycota	Ascomycota	0.015	0.321	29
		OTU2200	5201	unclassified	unclassified	0.068	0.337	28
		OTU5403	1789	Magnaporthe	Ascomycota	0.011	0.320	28
		OTU5846	1485	unclassified_c__Leotiomycetes	Ascomycota	0.012	0.325	27
		OTU4425	9770	unclassified	unclassified	0.011	0.314	27
		OTU4250	3463	unclassified	unclassified	0.009	0.307	27
		OTU6498	12083	unclassified_p__Ascomycota	Ascomycota	0.055	0.296	27
		OTU1965	5951	Clitopilus	Basidiomycota	0.046	0.325	26
		OTU5761	3945	unclassified	unclassified	0.009	0.319	26
		OTU5590	3691	unclassified_o__Pleosporales	Ascomycota	0.008	0.317	26
		OTU4323	5781 5781	unclassified	unclassified	0.015	0.309	26
		OTU994	5828	unclassified	unclassified	0.020	0.293	26
		OTU4659	4215	unclassified_o__Sordariales	Ascomycota	0.012	0.285	26
Rainforest	Rainy							

	OTU10963	4510	Neobulgaria	Ascomycota	0.032	0.205	32
	OTU11424	1413	unclassified_f__Pezizaceae	Ascomycota	0.032	0.205	32
	OTU10509	1200	unclassified_c__Sordariomycetes	Ascomycota	0.040	0.204	32
	OTU10426	1105	unclassified_c__Sordariomycetes	Ascomycota	0.025	0.024	30
	OTU11839	1086	unclassified	unclassified	0.035	0.204	28
	OTU3670	1181	Pyrenochaetopsis	Ascomycota	0.036	0.204	27

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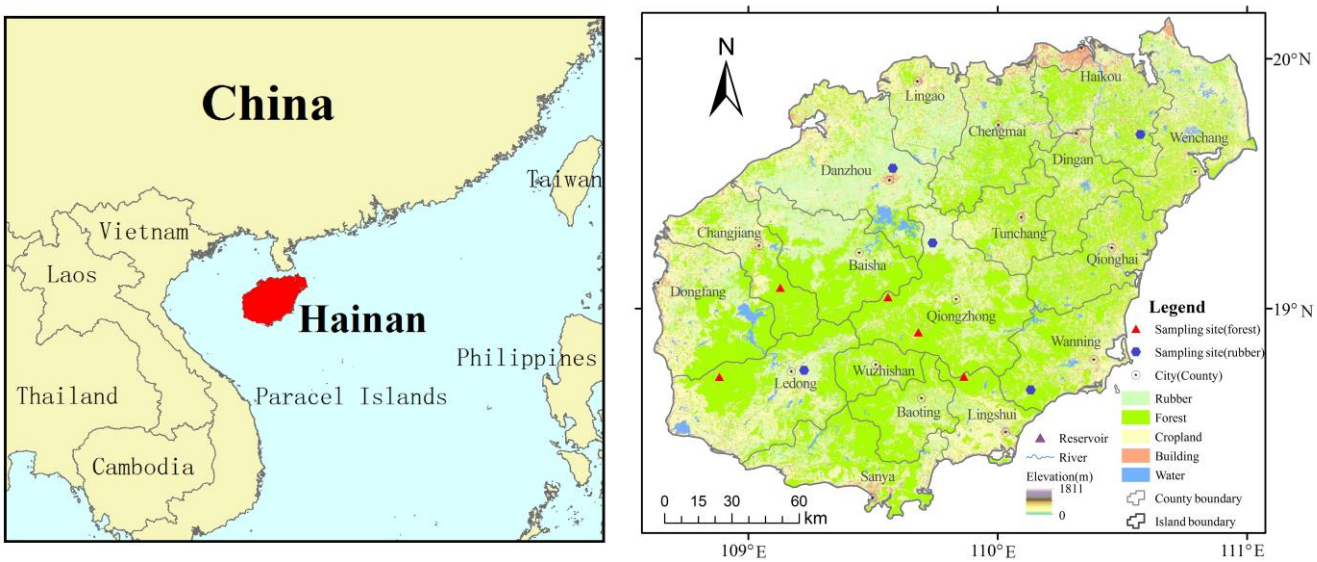

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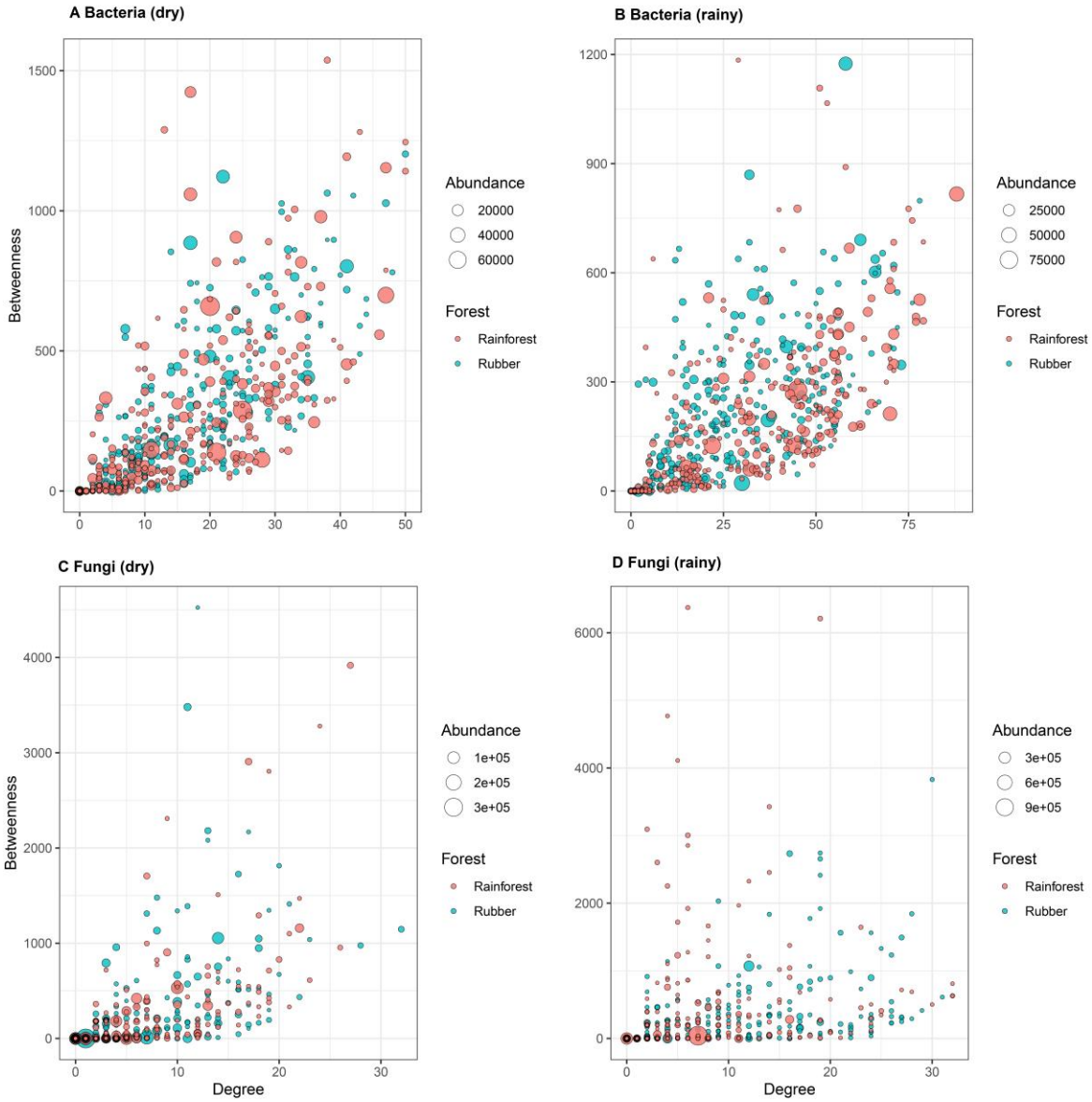


Figure S2 Relationship between network properties and OTU abundance of rubber plantations and tropical rainforest across season. The size of the node indicates the OTU abundance.

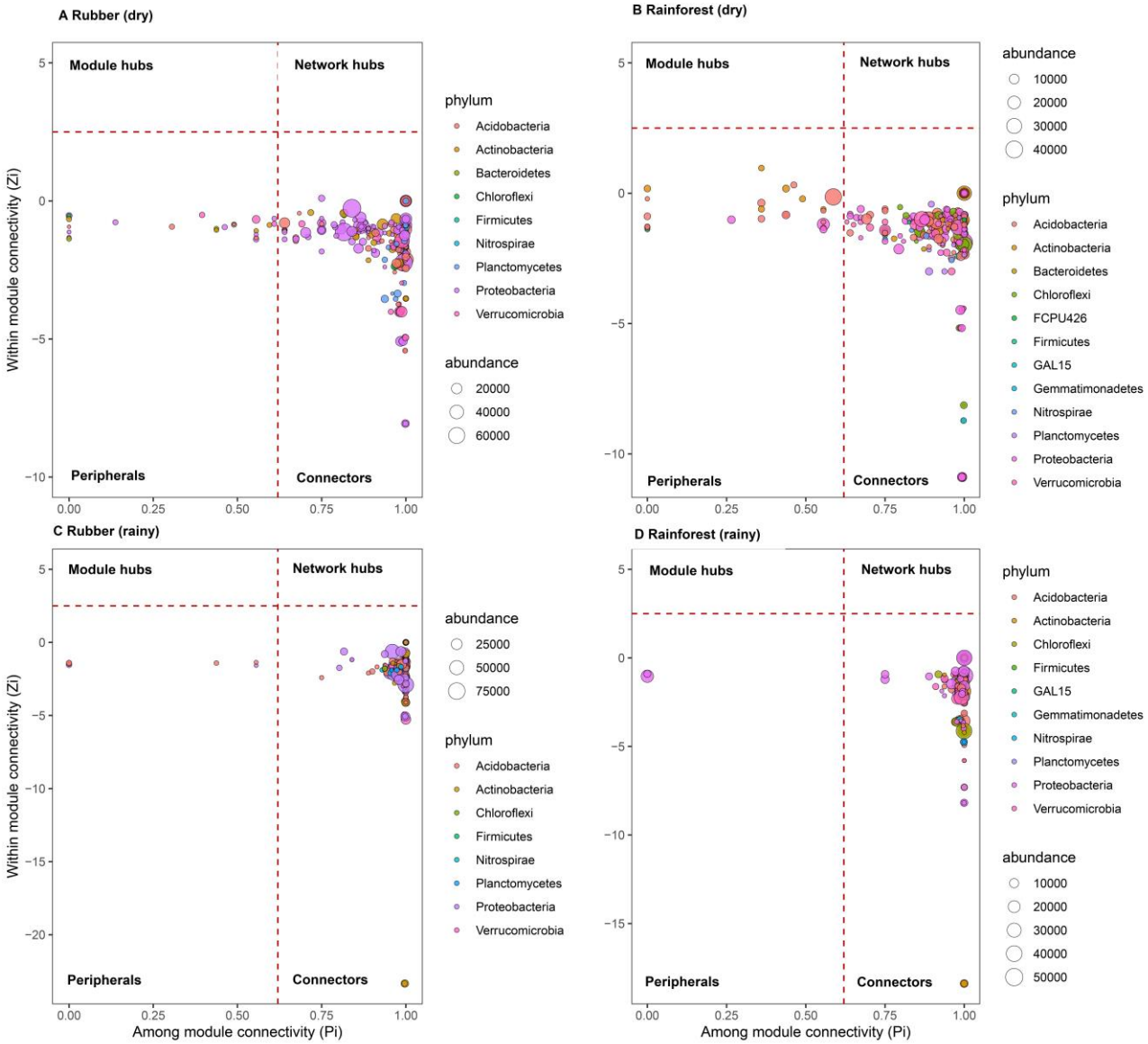
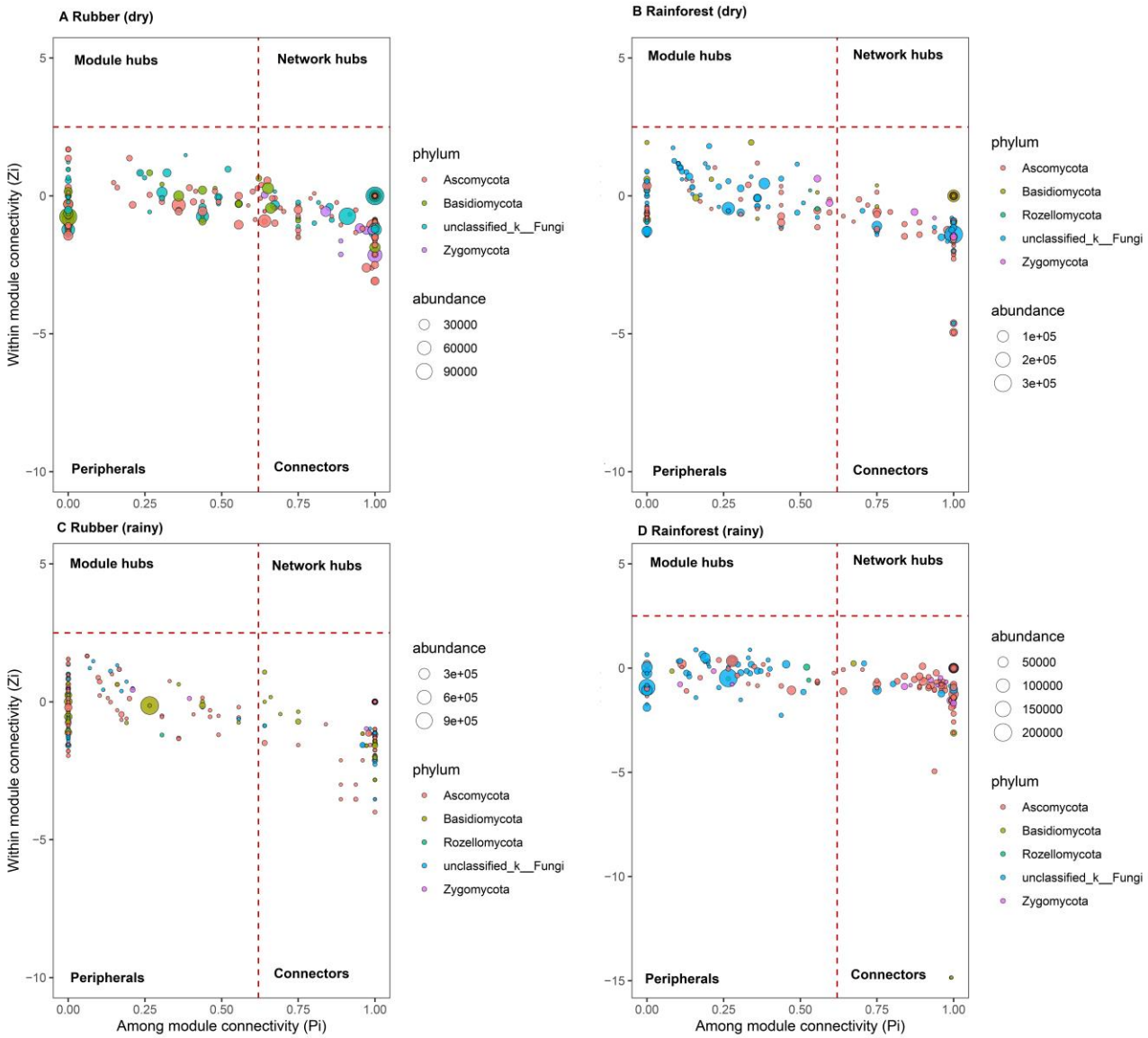


Figure S3 Z_i-P_i plot showing the topological distribution of OTUs in the bacterial networks. Each point represents a fungal OTU. Threshold values of Zi and Pi for classification are 2.5 and 0.62, respectively. The size of the node indicates the OTU abundance.



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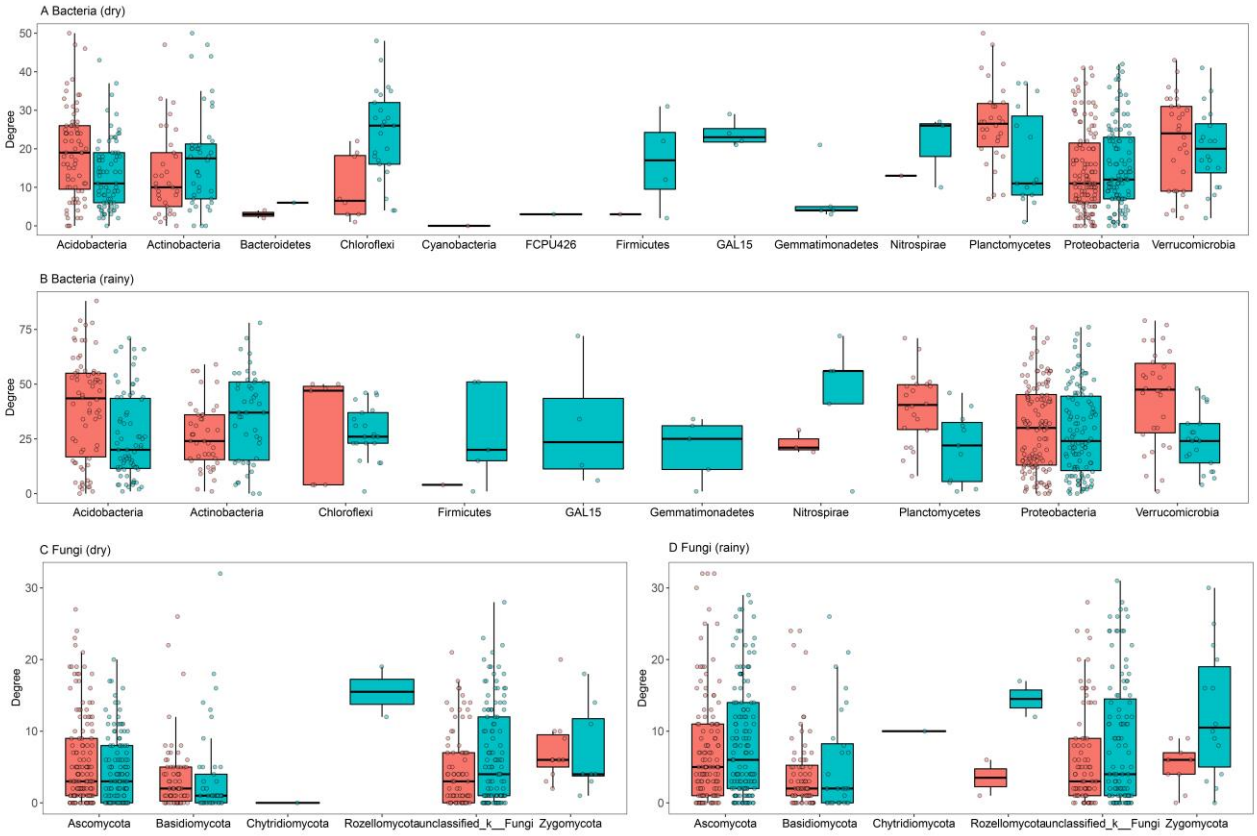

Figure S5 Network degree of soil bacterial and fungal community of rubber plantations (blue) and tropical rainforest (red) in dry season and rainy season (A: bacteria in dry season, B: bacteria in rainy season, C: fungal in dry season, D: fungal in rainy season)

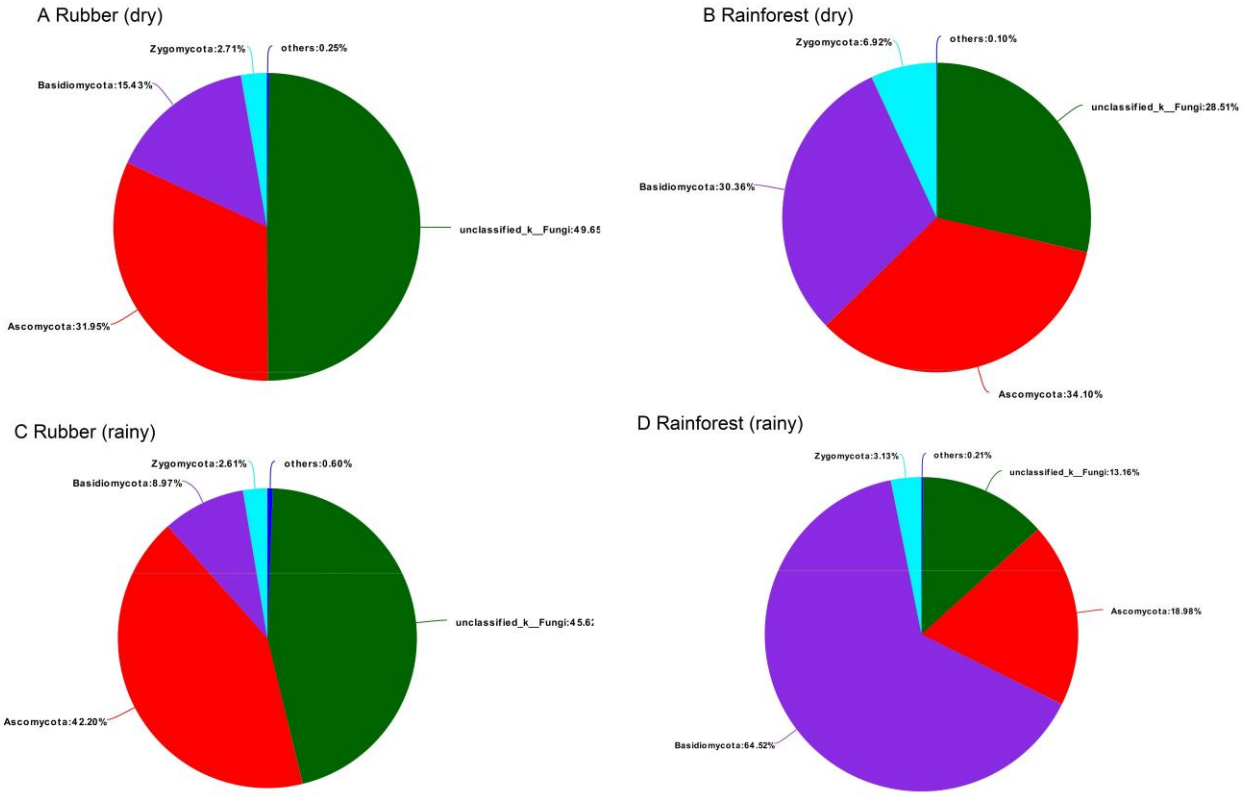

Figure S6 Phylum composition of soil fungal community of rubber plantations and tropical rainforest across seasons.

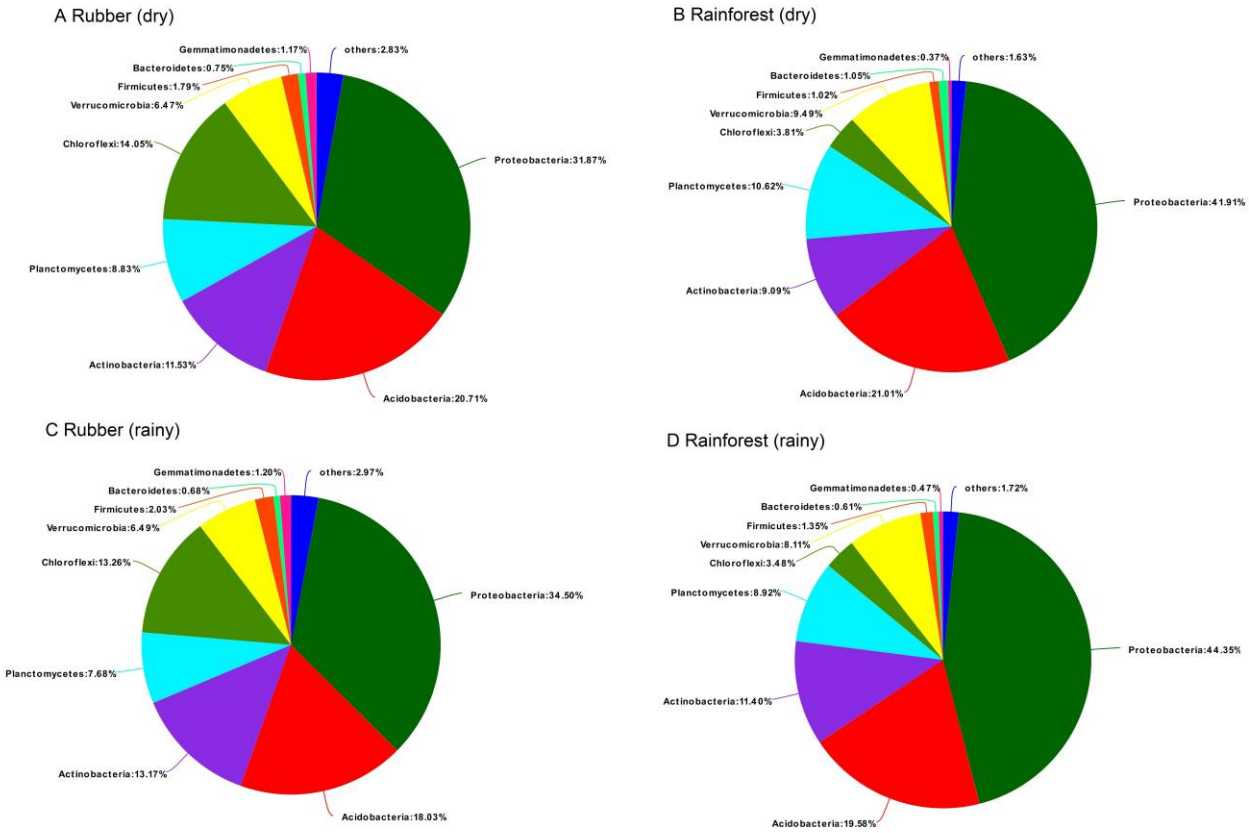

Figure S7 Phylum composition of soil bacterial community of rubber plantations and tropical rainforest across seasons.