

Supplementary Material

Supporting Information for the manuscript paper entitled: “***The impact and determinants of mountainous topographical factors on soil microbial community characteristics***” by Jiantao Yu ¹, Suyan Li ^{1,*}, Xiangyang Sun ¹, Wenzhi Zhou ¹, Libing He ¹, Guanyu Zhao ¹, Zhe Chen ¹, Xueting Bai ¹, Jinshuo, Zhang ¹

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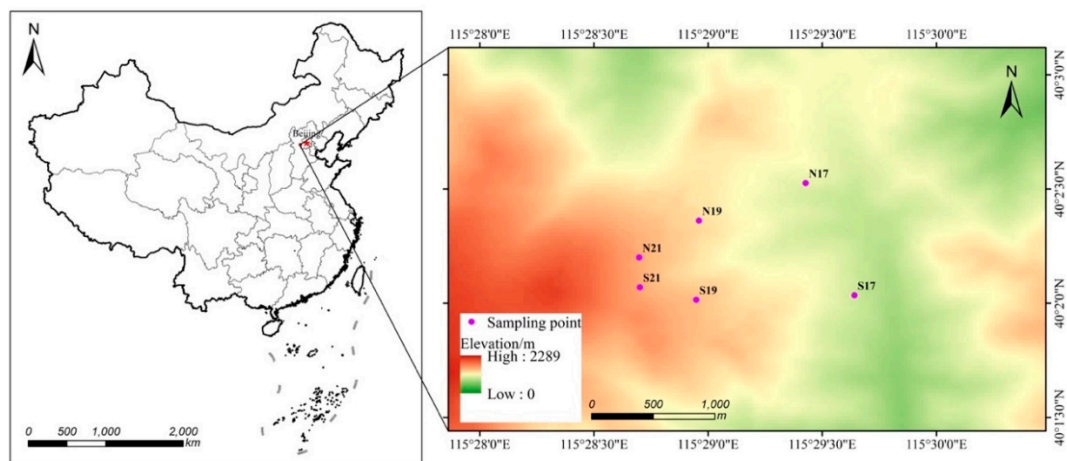


Figure S1. Location of the research area

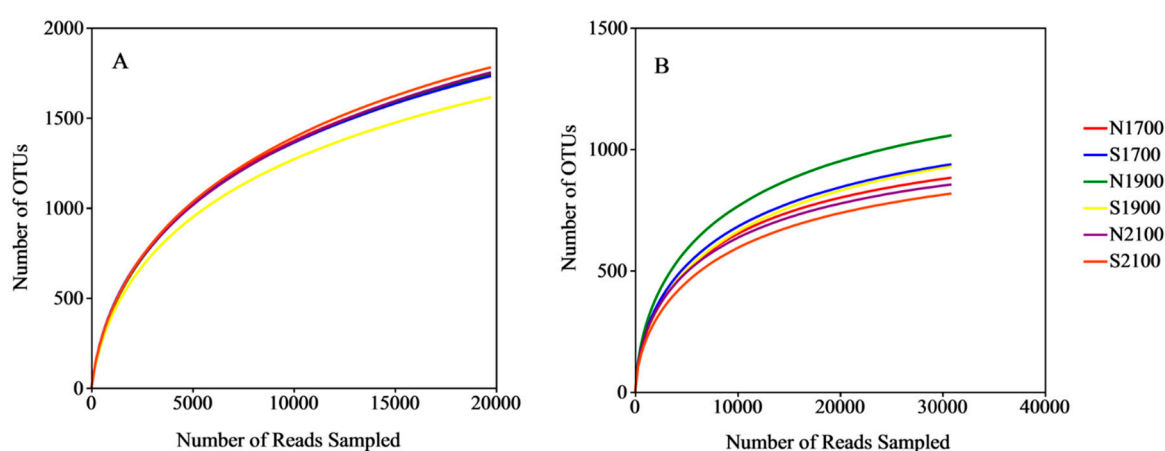


Figure S2. Rarefaction contours of operational taxonomic units (OTUs) for soil bacterial (A) and fungal (B) communities. N for north, shady slopes, S for south, sunny slopes

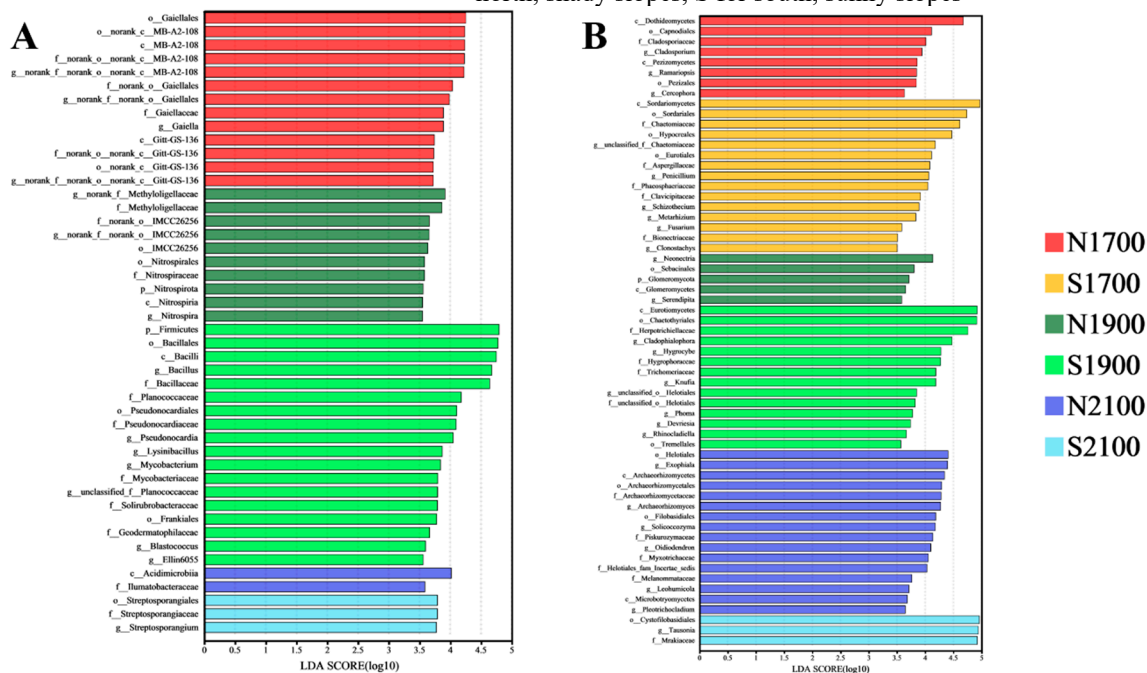


Figure S3. Variations in the community structure of soil bacteria (A) and fungi (B) at various altitudes and slope. N for north, shady slopes, S for south, sunny slopes

Table S1. The soil physicochemical properties for South-facing slop and North-facing slop soils in different altitudes.

		Soil pH	BD (g·cm ⁻³)	Soil moisture (%)	SOC (g·kg ⁻¹)	TN (g·kg ⁻¹)	TP (g·kg ⁻¹)	TK (g·kg ⁻¹)	AP (mg·kg ⁻¹)	AK (mg·kg ⁻¹)	NH ₄ ⁺ -N (mg·kg ⁻¹)	NO ₃ ⁻ -N (mg·kg ⁻¹)
South-facing slop	S1700	7.21±0.03	1.13±0.04	28.24±2.72	32.52±1.74	2.40±0.02	0.59±0.04	17.95±0.46	25.00±2.64	156.33±2.08	6.92±0.61	1.19±0.30
		Aa	Aa	Ab	Ac	Aa	Aa	Ac	Aa	Ab	Ab	Aa
	S1900	7.21±0.14	1.05±0.07	33.75±2.91	54.86±0.86	2.15±0.03	0.56±0.01	29.25±0.43	17.60±3.48	248.33±1.53	10.96±2.37	1.31±0.06
		Aa	Aa	Aa	Aa	Ac	Aa	Aa	Bb	Aa	Aa	Aa
	S2100	7.00±0.02	1.10±0.15	32.10±1.42	44.62±0.60	2.30±0.02	0.58±0.05	23.75±1.42	22.93±1.84	140.33±2.08	6.01±0.51	1.00±0.14
		Ab	Aa	Aab	Ab	Ab	Aa	Ab	Aab	Ac	Bb	Aa
North-facing slop	N1700	7.26±0.12	1.01±0.04	32.30±3.20	34.91±1.72	2.40±0.03	0.69±0.06	18.66±1.42	21.46±3.12	129.67±2.08	5.72±2.31	0.83±0.52
		Aa	Aa	Ab	Aa	Aa	Aa	Ab	Ab	Bb	Ab	Aa
	N1900	7.10±0.13	0.73±0.12	41.51±1.38	55.36±1.18	2.32±0.17	0.60±0.05	23.59±1.03	30.98±1.88	222.33±1.52	9.58±0.94	1.41±0.23
		Aab	Bb	Ba	Aa	Aa	Ab	Ba	Aa	Ba	Aa	Aa
	N2100	6.95±0.02	0.97±0.07	35.21±3.53	45.15±1.44	2.25±0.07	0.54±0.02	24.50±1.14	22.92±3.30	128.33±2.09	8.67±0.14	1.15±0.04
		Ab	Aa	Ba	Aa	Aa	Ab	Aa	Ab	Bb	Aa	Aa
Slope aspect		ns	**	***	ns	ns	ns	*	**	***	ns	ns
Altitude		**	*	***	***	**	*	***	ns	***	**	ns
Slope aspect × Altitude		ns	ns	ns	ns	*	*	***	***	***	ns	ns

Note: BD: Soil bulk density; TN: Total nitrogen; TP: total phosphorus; AK: Available potassium; SOC: soil organic carbon; TK: total potassium AP: Available phosphorus; NO₃⁻-N: Nitrate nitrogen; NH₄⁺-N: Ammonium nitrogen; Upper case letters indicate differences between shaded and sunny slopes ($p < 0.05$). Lowercase letters indicate three different elevation gradients ($p < 0.05$). Non-significance is denoted by NS, while *, **, *** indicate statistical significance at $p < 0.05$, $p < 0.01$, $p < 0.001$, respectively. N for north, shady slopes, S for south, sunny slopes, for example: N1700 means 1700m above sea level on the north slope.

Table S2. Two-way variance analysis of dominant bacterial phyla and classes

Taxonomy		Slope aspect		Altitude		Slope aspect×Altitude	
		F	P	F	P	F	P
Phyla	Actinobacteriota	9.505	**	-	-	-	-
	Proteobacteria	-	-	4.705	*	-	-
	Acidobacteriota	-	-	-	-	-	-
	Firmicutes	-	-	15.057	***	-	-
	Chloroflexi	-	-	8.441	**	-	-
	Gemmatimonadota	-	-	7.476	**	-	-
	Verrucomicrobiota	-	-	-	-	-	-
	Methyloirabiolota	4.922	*	3.967	*	9.146	**
	Bacteroidota	-	-	8.897	**	-	-
	Myxococcota	5.023	*	-	-	-	-
	Planctomycetota	10.588	**	-	-	-	-
	others	7.771	*	-	-	16.103	***
Classes	Alphaproteobacteria	-	-	4.277	*	-	ns
	Actinobacteria	-	-	7.234	**	4.722	*
	Thermoleophilia	15.128	**	-	-	-	-
	Bacilli	-	-	14.792	***	-	-
	Vicinamibacteria	-	-	-	-	-	-
	Blastocatellia	-	-	-	-	-	-
	Gammaproteobacteria	-	-	-	-	-	-
	KD4-96	-	-	6.199	*	-	-
	Acidimicrobiia	24.658	***	-	-	-	-

MB-A2-108	-	-	10.936	**	-	-
Gemmatimonadetes	-	-	6.593	*	-	-
Verrucomicrobiae	-	-	-	-	-	-
Methylomirabilia	4.922	*	3.967	*	9.146	**
Bacteroidia	-	-	9.360	**	-	-
Chloroflexia	-	-	-	-	-	-
Anaerolineae	-	-	3.970	*	-	-
Acidobacteriae	-	-	-	-	-	-
Gitt-GS-136	-	-	11.087	**	-	-
others	-	-	-	-	7.013	*

Note: - indicates non-significance, *, **, and *** indicate significance at $p < 0.05$, $p < 0.01$ and $p < 0.001$, eachly.

Table S3. Two-way variance analysis of dominant fungal phyla and classes

Taxonomy		Slope aspect		Altitude		Slope aspect×Altitude	
		F	P	F	P	F	P
Phyla	Ascomycota	-	-	-	-	5.727	*
	Mortierellomycota	-	-	-	-	-	-
	Basidiomycota	-	-	-	-	-	-
	unclassified_k_Fungi	-	-	-	-	-	-
	Chytridiomycota	6.805	*	8.110	**	11.330	**
	Glomeromycota	-	-	8.393	**	15.146	***
	others	-	-	-	-	-	-
Classes	Mortierellomycetes	-	-	-	-	-	-
	Sordariomycetes	-	-	17.141	***	4.222	*
	Eurotiomycetes	8.768	*	7.095	**	4.278	*
	Agaricomycetes	-	-	-	-	-	-
	Dothideomycetes	-	-	7.321	**	5.124	*
	Tremellomycetes	-	-	-	-	-	-
	Leotiomycetes	6.127	*	6.639	*	-	-
	unclassified_p_Ascomycota	-	-	-	-	-	-
	unclassified_k_Fungi	-	-	-	-	-	-
	Archaeorhizomycetes	8.522	*	4.669	*	4.338	*
	Chytridiomycota	6.090	*	7.673	**	10.660	**
	Glomeromycetes	-	-	5.098	*	8.594	**
	Pezizomycetes	19.513	***	-	-	-	-
	Microbotryomycetes	-	-	5.363	*	7.586	**
	others	9.102	*	-	-	-	-

Note: - indicates non-significance, *, **, and *** indicate significance at $p < 0.05$, $p < 0.01$ and $p < 0.001$, correspondingly