Supplementary material

Table S1. Results of the permutation test of the redundancy analysis (RDA), estimating potential significant relationships between microbial community composition, leaf, litter and soil properties. The results are based on 999 permutations.

		PLFA	
Environment parameters	Explains %	Pseudo-*F*	*P* value
Leaf and litter			
LTN	51.9	7.5	0.006**
LOC	42.4	44.4	0.004**
MOC	1.3	1.5	0.29
LTP	0.9	1.1	0.368
MTN:MTP	1.7	2.9	0.126
LOC: LTP	1.0	2.7	0.17
MOC:MTP	0.4	1.5	0.428
Soil			
TDN:SAP	56.5	9.1	0.002**
DOC:TDN	39.3	57.4	0.002**
DOC:SAP	2.3	6.3	0.02*
N:P imbalance(L)	1.0	5.5	0.028*
STN:STP	0.5	4.6	0.04*
N:P imbalance(T)	0.3	6.8	0.11
C:N imbalance(L)	<0.1	1.1	0.514

Table S2. Results of the permutation test of the redundancy analysis (RDA), estimating potential significant relationships between soil extracellular enzyme, leaf, litter and soil properties. The results are based on 999 permutations.

	Enzyme activity		
Environment parameters	Explains %	Pseudo-*F*	*P* value
Leaf and litter			
MTN	43.5	5.4	0.002**
LOC:LTN	22.5	4.0	0.044*
LTN:LTP	12.6	2.9	0.05*
LOC: LTP	4.6	1.1	0.396
MOC:MTN	5.0	1.3	0.352
MOC	3.1	0.7	0.534
Soil			
N:P imbalance(T)	42.4	5.2	0.008**
STP	25.3	4.7	0.016*
STN:STP	9.0	1.9	0.126
SAP	5.8	1.3	0.318
DOC:SAP	3.9	0.9	0.498
C:N imbalance(T)	5.0	1.2	0.396
DOC:TDN	6.6	3.4	0.262

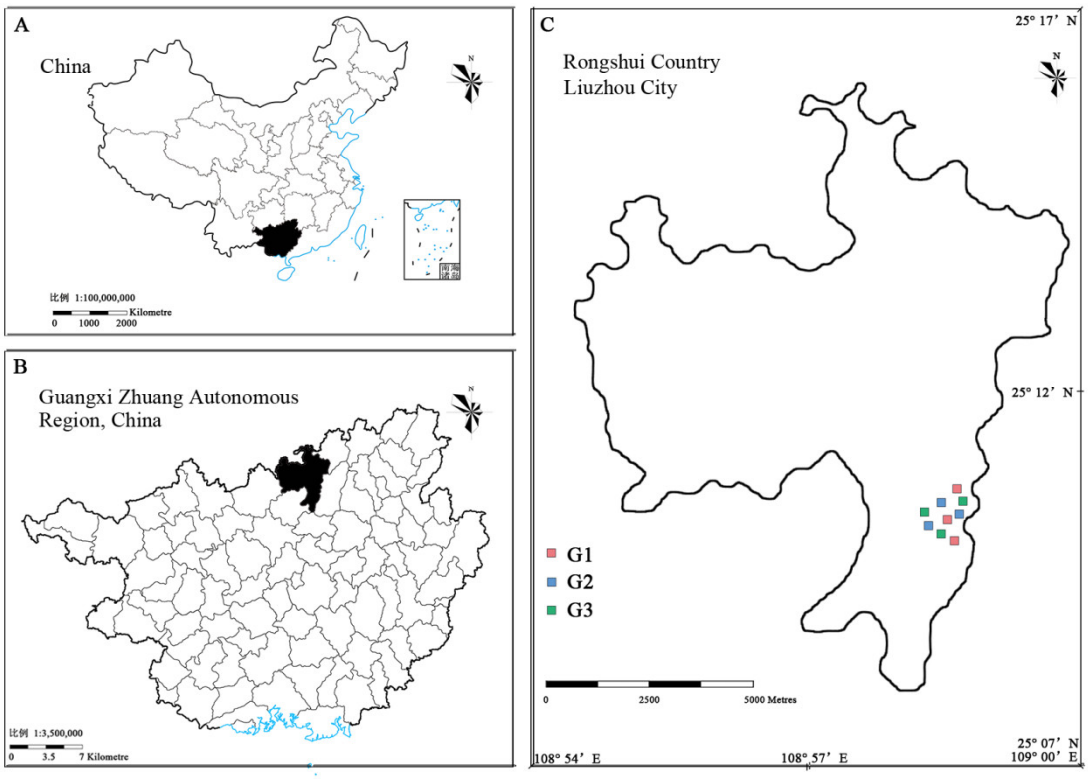

Figure S1. Research area. G1, The first-generation Chinese fir plantations; G2, The second-generation Chinese fir plantations; G3, The third-generation Chinese fir plantations.

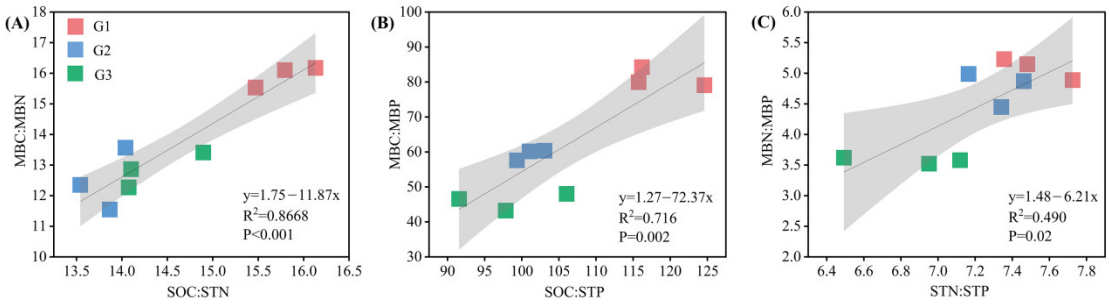

Figure S2. Relationships between the stoichiometry of soil organic carbon, nitrogen, and phosphorus (SOC:STN, SOC:STP, STN:STP) and microbial biomass (MBC:MBN, MBC:MBP, MBN:MBP).

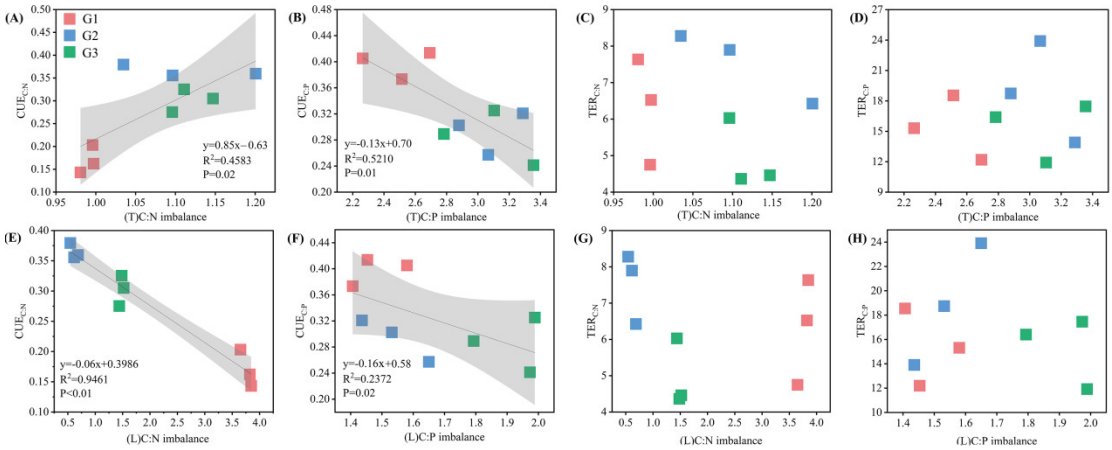

Figure S3. Carbon-use efficiency $CUE_{C:N}$ and $CUE_{C:P}$, Threshold Elemental Ration $TER_{C:N}$ and $TER_{C:P}$ and their relations to the C:N imbalance and C:P imbalance for the total resource pool (**A-D**) and labile resource pool (**E–H**).

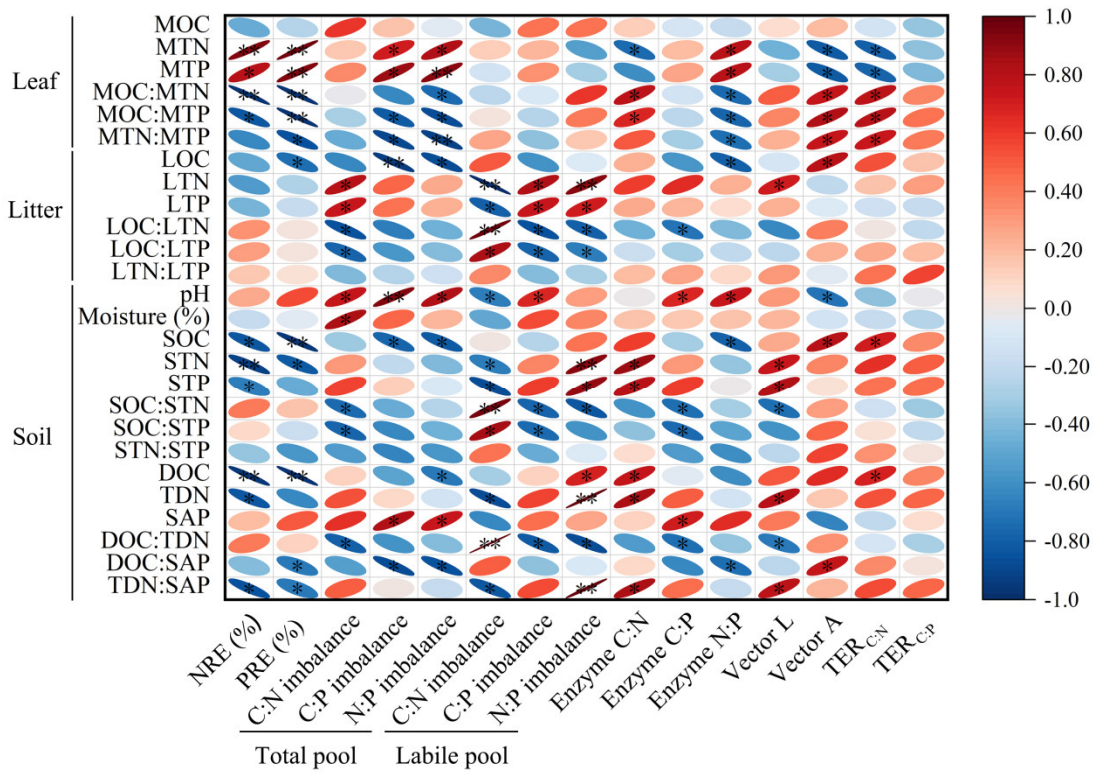

Figure S4. The N and P resorption efficiency, the stoichiometric imbalance, indicators of microbial resource limitation in relation to leaf, litter and soil properties. MOC, mature leaf organic carbon; MTN, mature leaf total nitrogen; MTP, mature leaf total phosphorus; LOC, litter organic carbon; LTN, litter total nitrogen; LTP, litter total phosphorus SOC, soil organic carbon; STN, soil total nitrogen; STP, soil total phosphorus; DOC, dissolved organic carbon; TDN, total dissolved nitrogen; SAP, soil available phosphorus; NRE, leaf N resorption efficiency (%); PRE, leaf P resorption efficiency (%). The stars indicate significant correlations between ench other. Significant level: *, $P < 0.05$; **, $P < 0.01$.