

Figure S1. Microbial LEfSe multilevel species hierarchical tree diagrams under various treatments. (a) fungal markers (b) bacterial markers. CK: Control; AM: AMF application treatment; TL: *T. longibrachiatum* application treatment; AT: AMF and *T. longibrachiatum* application treatment. The figure of p, c, o, f and g denotes phylum, class, order, family and genus respectively.



Figure S2. Map of the experimental location. The latitude and longitude of the map are the exact locations of the experimental.

Table S1. Two-way ANOVA analysis of different treatments on soil chemical properties.

Treatments	CK	AM	TL	AT	*F*(AM)	*F*(TL)	*F*(AM×TL)
pH	6.06±0.02d	6.24±0.03b	6.11±0.03c	6.29±0.03a	159.01**	10.12**	0.01ns
SOM/(g·kg^{-1})	35.70±0.15a	33.83±0.25b	35.33±0.32a	35.67±0.40a	18.44**	20.15**	41.49**
TP/(g·kg^{-1})	0.64±0.01d	0.66±0.01c	0.74±0.02a	0.71±0.01b	0.23ns	163.17**	21.94**
TK/(g·kg^{-1})	15.17±0.06c	15.77±0.06a	14.90±0.00d	15.60±0.00b	760.50**	814.5**	4.50ns
TN/(g·kg^{-1})	1.46±0.11d	1.57±0.11c	1.77±0.01a	1.74±0.01b	41.14**	1522.57**	126.00**
AP/(mg·kg^{-1})	21.97±0.40a	21.33±0.35a	20.37±0.35b	19.83±0.35b	7.66*	54.06**	0.06ns
AK/(mg·kg^{-1})	161.33±0.58a	108.67±0.58c	114.67±0.58b	107.33±0.58d	8100.00**	5184.00**	4624.00**
AN/(mg·kg^{-1})	130.67±2.31a	127.00±4.58a	131.33±0.58a	130.00±0.00a	1.80ns	2.45ns	1.25ns
NO_3^--N/(mg·kg^{-1})	3.89±0.48a	2.01±0.20b	2.22±0.22b	2.46±0.25b	21.35**	11.83**	35.64**
NH_4^+-N/(mg·kg^{-1})	0.93±0.09a	1.03±0.10a	0.95±0.09a	1.06±0.11a	3.45ns	0.17ns	0.01ns

CK: Control; AM: AMF application treatment; TL: *T. longibrachiatum* application treatment; AT: AMF and *T. longibrachiatum* application treatment. Values in the table are presented as means ± standard error. Different letters in the same row showed a statistically significant differences. *$P < 0.05$; ** $P < 0.01$; ns: No statistically significant difference.