

Table S1 A variance analysis of biochar and fertilizer application on soil bulk density and moisture content (F values)

Test factor	F value					
	soil bulk density			soil water content		
	0-10 cm	10-20 cm	20-40 cm	0-10 cm	10-20 cm	20-40 cm
C	3.02 *	1.08	0.33	9.91 **	9.62 **	10.99 **
N	1.74	2.40	0.15	3.26 *	7.20 **	7.30 **
C×N	0.79	0.96	0.04	7.48 **	8.36 **	5.54 **

Note: The letters W and F represent irrigation and nutrient solution concentration. * and ** indicate significant differences ($P < 0.05$)

and extremely significant differences ($P < 0.01$), respectively. The same below.

Table S2 A variance analysis of biochar and its application with N fertilizer on the soil aggregate distribution (F values)

	Test factor	F value			
		< 0.053 mm	0.053-0.25 mm	0.25-2 mm	>2 mm
0-10 cm	C	2.76	4.41*	2.87 *	0.75
	N	6.37 **	13.89 **	0.79	8.35 **
	C×N	3.12*	0.74	0.62	1.76
10-20 cm	C	0.95	0.65	0.43	0.58
	N	0.55	5.36 **	2.81	1.22
	C×N	0.22	0.33	0.10	0.44
20-40 cm	C	7.72 **	19.79 **	4.70 **	5.53 **
	N	10.91 **	27.60 **	28.73 **	6.96 **
	C×N	0.86	1.20	0.61	2.16

Table S3 A variance analysis of biochar and its application with N fertilizer on the concentration of the total phospholipid fatty acids

(PLFAs; *F* values)

Test factor	<i>F</i> value					
	Total	Bacteria	Fungi	Actinomycetes	Gm ⁺	Gm ⁻
	PLFA	PLFA	PLFA	PLFA	PLFA	PLFA
C	4.91 **	1.82	1.07	11.25 **	24.60 **	9.57 **
N	7.12 **	5.57 **	2.24	7.03 **	17.69 **	1.06
C×N	0.61	0.56	0.58	0.58	5.56 **	3.11*

Table S4 Principal component analysis results

Indicators	F1	F2	F3
Bacteria	0.727	0.408	0.493
Fungi	0.831	-0.141	0.505
Actinomycetes	0.826	0.357	0.286
Total PLFA	0.814	0.358	0.424
F/B	0.618	-0.606	0.211
G+	0.627	0.725	-0.137
G-	0.722	0.251	0.312
G+/G-	0.224	0.739	-0.524
TOC	0.820	-0.087	-0.402
R _{0.25}	0.873	-0.390	-0.193
MWD	0.853	-0.407	-0.234
GMD	0.831	-0.430	-0.187
B	-0.926	0.233	0.273
Moisture	0.538	0.260	-0.755