Appendices A The types of fertilizers applied in this study and its carbon and nutrient contents (%).

The types of fertilizer		N	P_2O_5	K_2O	C
Chemical fertilizers	Urea	46.0	–	–	–
	Calcium superphosphate	–	12.0	–	–
	Diammonium phosphate	18.0	46.0	–	–
	Potassium chloride	–	–	60.0	–
	Monopotassium phosphate	–	52.0	34.0	–
Organic fertilizers	Pig manure	2.17	1.39	1.63	21.8
	Corn straw	1.04	0.32	1.69	42.7

Note: the contents of nutrients and carbon in organic fertilizers was calculated by dry weight; the water contents of pig manure and corn straw were 28.9% and 64.9%, respectively.

Appendices B The quantities of soil nutrient loss (mg kg^{-1}), and proportions (%) of nutrients loss in soil nutrients after aggregate fractionation under different fertilization treatments.

Treatments	The quantities of soil nutrients loss (mg kg^{-1})					The proportions of nutrient loss in soil nutrients (%)				
	C	NH_4^+-N	NO_3^--N	AP	AK	C	NH_4^+-N	NO_3^--N	AP	AK
CF	162.7	0.33	1.12	3.2	20.1	1.1	6.1	4.5	1.9	3.7
M	222.3	0.35	1.28	3.6	18.0	1.1	5.2	3.5	1.7	3.6
MS	203.1	0.40	1.19	3.1	18.3	0.9	5.5	2.7	1.4	3.8
S	232.8	0.45	1.51	3.0	17.2	1.0	5.7	2.8	1.5	3.7

Note: SOC soil organic carbon, NO_3^--N nitrate-N, NH_4^+-N ammonium-N, AP available phosphorus, and AK available potassium. The nutrient (SOC, NH_4^+-N, NO_3^--N, AP, and AK) contents of deionized water, used for aggregate fractionation, is very less and negligible.

Appendices C Effects of different fertilization treatments on the values of pH and EC within soil aggregates.

Soil variables	Treatments	Aggregate size			
		>2-mm	2–0.25-mm	0.25–0.053-mm	<0.053-mm
pH	CF	8.33 ± 0.02 Ab	8.29 ± 0.04 ABa	8.16 ± 0.03 Cab	8.24 ± 0.04 Ba
	M	8.44 ± 0.05 Aa	8.22 ± 0.08 Bab	8.23 ± 0.03 Ba	8.17 ± 0.06 Bab
	MS	8.31 ± 0.05 Ab	8.22 ± 0.03 ABab	8.14 ± 0.07 BCb	8.12 ± 0.02 Cb
	S	8.27 ± 0.01 Ab	8.17 ± 0.02 Bb	8.02 ± 0.03 Dc	8.11 ± 0.04 Cb
EC	CF	297.5 ± 12.5 Aa	206.7 ±4.0 Dab	225.0 ± 4.6 Cab	264.0 ± 2.0 Ba

(μS cm^{-1})	M	266.0 ± 1.0 Ab	204.4 ± 4.6 Dab	195.3 ± 1.2 Cc	237.3 ± 6.5 Bb
	MS	271.5 ± 5.5 Ab	201.2 ± 8.8 Db	216.7 ± 3.5 Cb	246.0 ± 7.8 Bb
	S	290.5 ± 7.5 Aa	215.3 ± 4.0 Ca	233.0 ± 7.0 Ba	243.0 ± 12.2 Bb

Note: Data are means ± S.E., n = 3. Capital letters indicate significant differences among different aggregate fractions, while lowercase letters indicate significant differences among different treatments within the same aggregate fraction at the $P < 0.05$ level. C/N the ratio of soil organic C to total N; EC electrical conductivity.

Appendices D Effects of different fertilization treatments on the contents of microbial subgroups within soil aggregates.

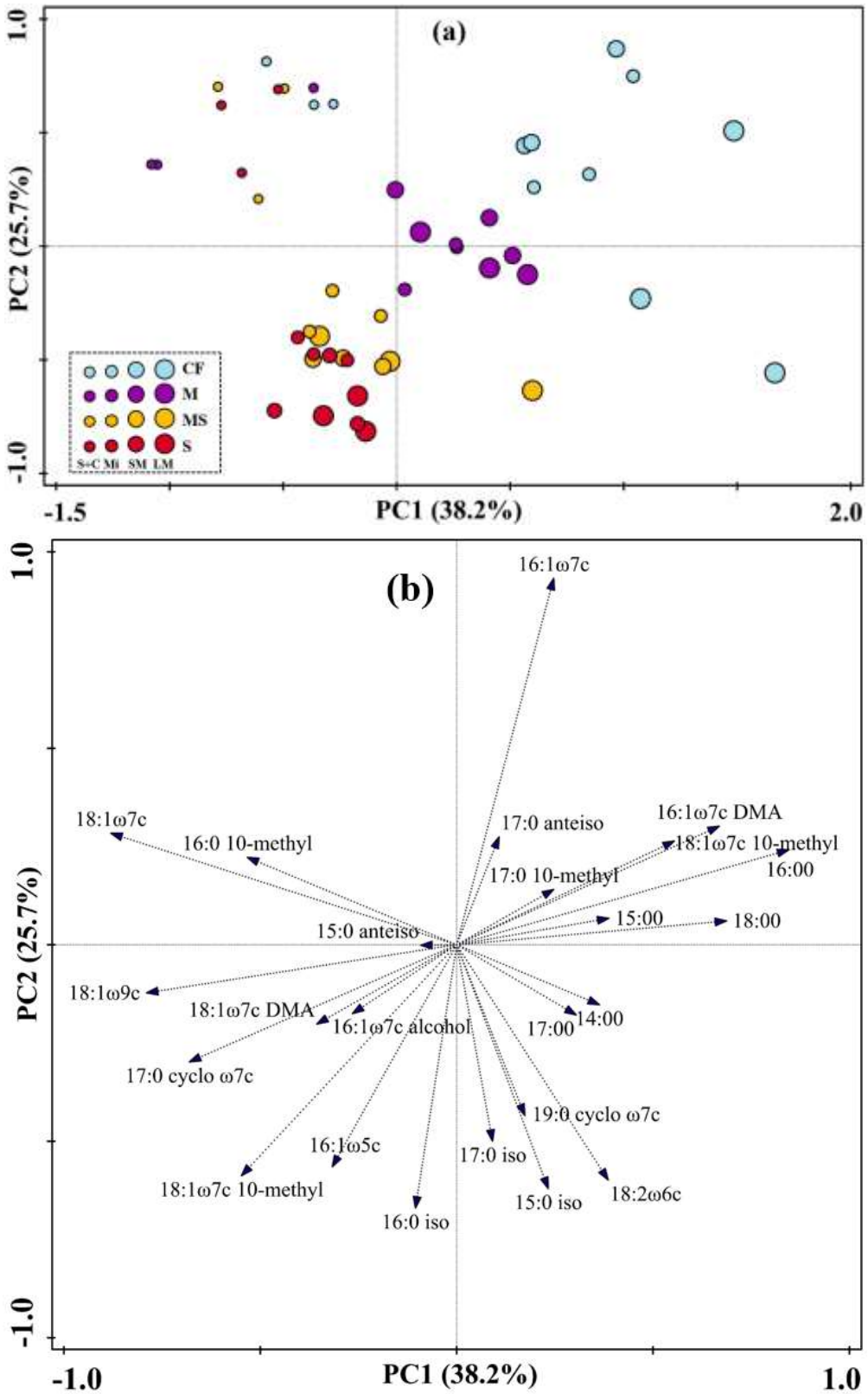
PLFAs (nmol g^{-1} soil)	Treatments	Aggregate size			
		>2-mm	2–0.25-mm	0.25–0.053-mm	<0.053-mm
Fungi	CF	5.8 ±0.5 ABd	4.6 ±0.5 BCd	3.5 ±0.5 Cc	7.1 ±0.8 Ab
	M	7.9 ±0.5 Abc	7.6 ±0.5 Bc	9.5 ±1.3 Ab	8.7 ±0.6 ABa
	MS	9.6 ±0.4 Bb	11.9 ±1.0 Ab	9.5 ±0.8 Bb	7.6 ±0.4 Cab
	S	12.0 ±1.1 Ba	14.0 ±1.2 Aa	11.5 ±0.5 Ba	7.9 ±0.6 Cab
Bacteria	CF	23.6 ±1.0 Bd	21.3 ±2.6 Bd	15.4 ±2.2 Cb	30.0 ±3.5 Aa
	M	30.8 ±1.4 ABc	28.3 ±2.6 Bc	32.7 ±2.9 ABa	36.1 ±3.7 Aa
	MS	36.2 ±2.2 ABb	42.7 ±5.0 Ab	33.8 ±3.7 Ba	32.2 ±2.6 Ba
	S	46.5 ±4.1 Aa	49.9 ±4.9 Aa	38.7 ±3.9 Ba	33.5 ±3.3 Ba
Actinomycetes	CF	6.7 ±0.4 Bd	6.5 ±0.6 Bc	4.6 ±0.9 Cb	9.2 ±1.0 Aa
	M	9.2 ±0.3 Bc	8.9 ±0.7 Bb	9.0 ±0.4 Ba	10.6 ±0.9 Aa
	MS	10.9 ±1.1 ABb	12.7 ±1.3 Aa	9.2 ±0.9 Ba	9.4 ±0.7 Ba
	S	13.9 ±0.7 Aa	14.3 ±1.4 Aa	10.2 ±1.3 Ba	9.7 ±0.7 Ba
SF	CF	4.4 ±0.4 Ac	3.4 ±0.3 Bd	2.6 ±0.3 Cc	5.1 ±0.4 Ab
	M	5.0 ±0.3 Cc	5.2 ±0.4 BCc	6.7 ±1.0 Ab	6.2 ±0.4 ABa
	MS	6.6 ±0.2 Bb	8.3 ±0.7 Ab	6.7 ±0.6 Bb	5.4 ±0.2 Cb
	S	8.3 ±0.6 Ba	10.1 ±1.0 Aa	8.5 ±0.2 Ba	5.6 ±0.3 Cab
AMF	CF	1.4 ±0.1 Bc	1.3 ±0.1 BCc	0.9 ±0.2 Cb	2.0 ±0.3 Ab
	M	2.9 ±0.2 Ab	2.4 ±0.1 Bb	2.8 ±0.3 ABa	2.5 ±0.2 ABa
	MS	3.0 ±0.2 Bb	3.6 ±0.3 Aa	2.8 ±0.3 Ba	2.2 ±0.2 Cab
	S	3.8 ±0.5 Aa	3.9 ±0.3 Aa	3.0 ±0.3 Ba	2.3 ±0.2 Cab
G+	CF	9.4 ±0.6 ABd	8.1 ±1.4 Bd	5.7 ±1.1 Cb	10.6 ±1.5 Aa
	M	12.5 ±0.2 Ac	11.1 ±1.4 Ac	12.7 ±1.3 Aa	13.0 ±1.4 Aa
	MS	14.6 ±0.7 ABb	17.0 ±1.6 Ab	12.8 ±1.5 BCa	11.8 ±1.4 Ca
	S	19.3 ±2.0 Aa	19.7 ±2.0 Aa	14.1 ±1.5 Ba	12.2 ±1.4 Ba
G−	CF	13.5 ±0.4 Bd	12.7 ±1.1 Bb	9.2 ±1.1 Cc	18.7 ±2.0 Aa
	M	17.5 ±1.3 Bc	16.4 ±1.1 Bb	19.1 ±1.5 Bb	22.3 ±2.2 Aa
	MS	20.7 ±1.6 ABb	24.8 ±3.3 Aa	20.1 ±2.2 Bb	19.6 ±1.3 Ba
	S	26.1 ±2.1 ABa	29.0 ±2.9 Aa	23.6 ±2.4 BCa	20.5 ±1.9 Ca

Note: Data are means ± S.E., n = 3. Capital letters indicate significant differences among different aggregate fractions within the same fertilization treatment, while lowercase letters indicate significant differences among different fertilization treatments within the same aggregate fraction at the $P < 0.05$ level. AMF arbuscular mycorrhizal fungi, SF saprotrophic fungi, G+ Gram-positive bacteria, G− Gram-negative bacteria.

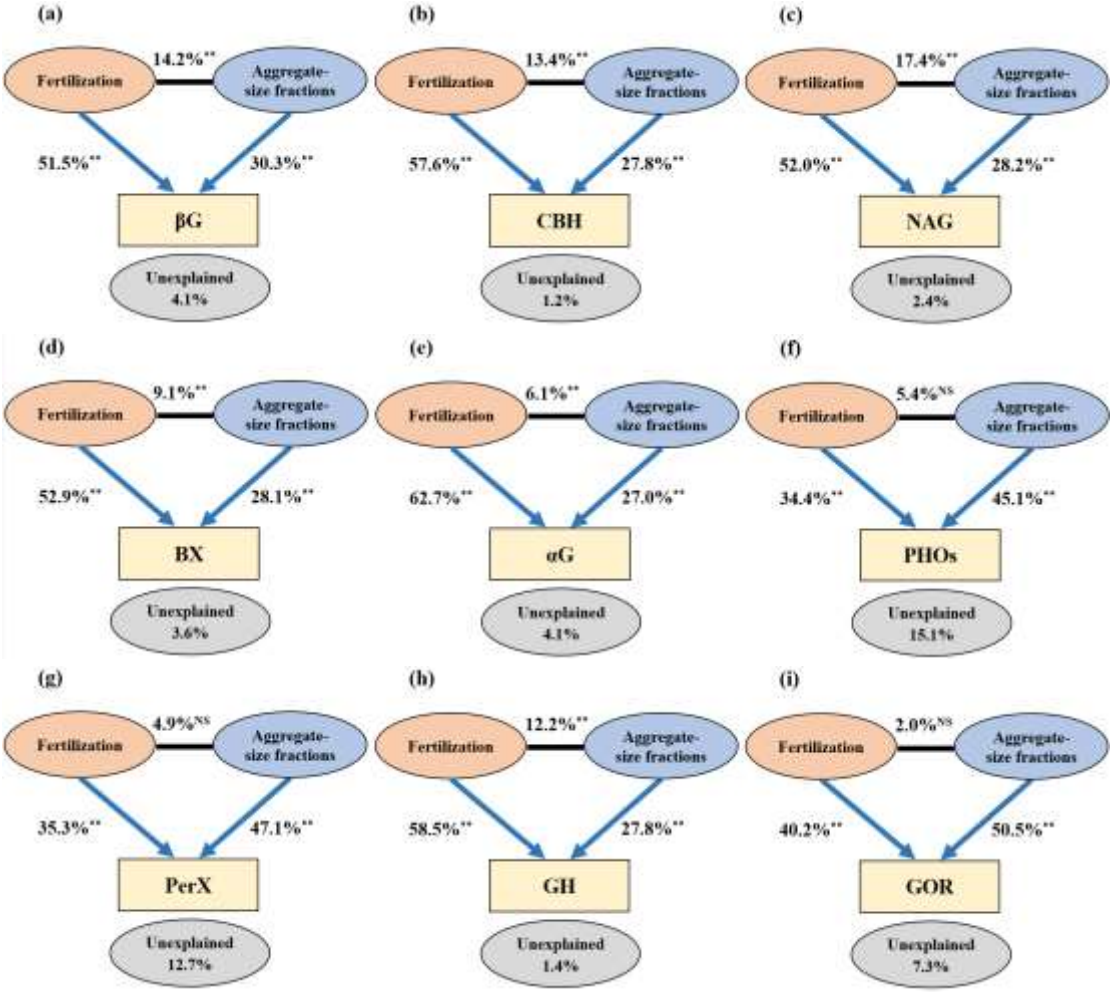
Appendices E Effects of different fertilization treatments on the relative abundance of microbial subgroups within soil aggregates.

Relative abundance of microbial subgroups (%)	Treatments	Aggregate size			
		>2-mm	2–0.25-mm	0.25–0.053-mm	<0.053-mm
AMF	CF	3.2 ± 0.0 ABc	3.3 ± 0.1 ABb	3.1 ± 0.1 Bc	3.6 ± 0.2 Ab
	M	5.1 ± 0.2 Aa	4.5 ± 0.2 Ba	4.5 ± 0.2 Ba	3.8 ± 0.0 Cab
	MS	4.4 ± 0.1 Ab	4.6 ± 0.5 Aa	4.5 ± 0.1 Aa	3.9 ± 0.1 Ba
	S	4.4 ± 0.3 Ab	4.2 ± 0.2 Aa	4.2 ± 0.1 ABb	3.8 ± 0.1 Bab
SF	CF	10.0 ± 0.3 Aa	8.6 ± 0.1 Cc	8.9 ± 0.3 BCc	9.3 ± 0.3 Ba
	M	8.7 ± 0.3 Cb	9.6 ± 0.3 Bb	10.8 ± 0.7 Ab	9.5 ± 0.2 BCa
	MS	9.7 ± 0.3 Ba	10.5 ± 0.4 Aab	10.8 ± 0.3 Ab	9.3 ± 0.3 Ba
	S	9.7 ± 0.0 Ba	11.0 ± 0.8 Aa	12.0 ± 0.8 Aa	9.4 ± 0.3 Ba
G+	CF	21.5 ± 0.1 Ab	20.6 ± 1.8 Aa	19.8 ± 1.1 Aa	19.3 ± 0.8 Aa
	M	21.9 ± 0.7 Aab	20.7 ± 1.0 ABa	20.6 ± 0.5 ABa	19.9 ± 0.9 Ba
	MS	21.5 ± 0.5 Ab	21.4 ± 0.2 Aa	20.5 ± 0.7 Aa	20.3 ± 1.1 Aa
	S	22.6 ± 0.5 Aa	21.4 ± 0.9 Ba	19.7 ± 0.3 Ca	20.2 ± 0.6 Ca
G−	CF	30.9 ± 1.1 Ca	32.6 ± 0.4 Ba	31.9 ± 0.8 BCab	34.1 ± 0.3 Aa
	M	30.5 ± 1.0 Ba	30.7 ± 1.0 Bb	31.1 ± 0.7 Bb	34.3 ± 0.9 Aa
	MS	30.5 ± 1.1 Ba	31.2 ± 1.2 Bab	32.2 ± 0.5	33.9 ± 0.7 Aa
	S	30.6 ± 0.1 Da	31.6 ± 0.5 Cab	32.9 ± 0.5 Ba	34.2 ± 0.2 Aa

Note: Data are means ± S.E., n = 3. Capital letters indicate significant differences among different aggregate fractions, while lowercase letters indicate significant differences among different treatments within the same aggregate fraction at the $P < 0.05$ level. AMF arbuscular mycorrhizal fungi, SF saprotrophic fungi, G+ Gram-positive bacteria, G− Gram-negative bacteria.



Appendices F Principal component analysis (PCA) of phospholipid fatty acids (PLFAs) (a), and loading values for individual PLFAs (b) based on the 48 soil samples. Abbreviations: LM large macro-aggregates, SM small macro-aggregates, Mi micro-aggregates, S+C silt and clay fractions.



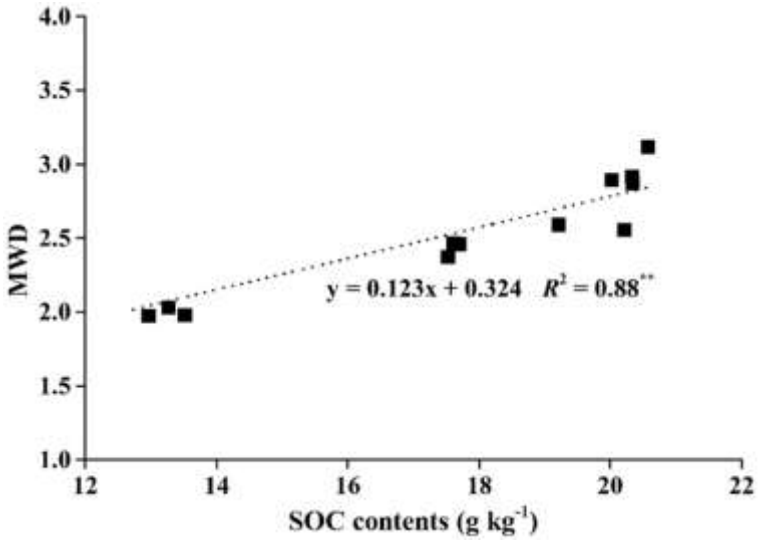
Appendices G Two-Way ANOVA comparing the main and interacting effects of fertilization and aggregate fractions on the EEAs. ** indicates significant at $P < 0.01$; * indicates significant at $P < 0.05$; NS indicates no significant difference. Abbreviations: βG β-Glucosidase, CBH β-Cellobiosidase, NAG N-Acetyl-glucosaminidase, BX β-Xylosidase, αG α-Glucosidase, PHOs phenol oxidase, PerX peroxidase, GH the geometric mean of the hydrolase activities, and GOR the geometric mean of the oxidase activities.

Appendices H Pearson's correlation coefficients between soil basic properties and EEAs, n = 48.

	βG	CBH	NAG	BX	αG	PHOs	PerX
SOC	**0.76****	**0.76****	**0.79****	**0.70****	**0.65****	0.17	0.09
NO_3^--N	**0.69****	**0.72****	**0.70****	**0.68****	**0.68****	0.29*	0.22
NH_4^+-N	**0.67****	**0.69****	**0.62****	**0.71****	**0.75****	0.40*	0.34*
AP	0.29*	0.25	0.30*	0.24	0.25	0.14	0.08
AK	**-0.70****	**-0.68****	**-0.66****	**-0.70****	**-0.69****	-0.39*	-0.27

pH	**-0.61****	**-0.63****	**-0.51****	**-0.67****	**-0.72****	**-0.62****	**-0.50****
EC	-0.26	-0.28	-0.17	-0.32*	-0.32*	**-0.43****	**-0.47****

Note: EEAs extracellular enzyme activities, SOC soil organic C, NO_3^--N nitrate-N, NH_4^+-N ammonium-N, AP available P, AK available K, EC electrical conductivity, βG β-Glucosidase, CBH β-Cellobiosidase, NAG N-Acetyl-glucosaminidase, BX β-Xylosidase, αG α-Glucosidase, PHOs phenol oxidase, and PerX peroxidase. ** indicates significant at $P < 0.01$, * indicates significant at $P < 0.05$.



Appendices I Relationships between SOC contents (g kg^{-1}) and the index of aggregate stability (MWD mean weight diameter). ** indicates significant at $P < 0.01$.

Appendices J Pearson's correlation coefficients between soil basic properties and total PLFAs, n = 48.

	SOC	NO_3^--N	NH_4^+-N	AP	AK	pH	EC
Total PLFAs	0.54**	0.68**	0.39**	0.29*	-0.21	-0.15	0.03

Note: SOC soil organic C, NO_3^--N nitrate-N, NH_4^+-N ammonium-N, AP available P, AK available K, EC electrical conductivity.

Appendices K Pearson’s correlation coefficients between soil aggregate-associated basic properties and vegetable yields, n = 12.

			>2 mm					2–0.25 mm					0.25–0.053 mm					<0.053 mm				
	MWD	BD	Total PLFAs	Gmea	SOC	NH_4^+-N	NO_3^--N	Total PLFAs	Gmea	SOC	NH_4^+-N	NO_3^--N	Total PLFAs	Gmea	SOC	NH_4^+-N	NO_3^--N	Total PLFAs	Gmea	SOC	NH_4^+-N	NO_3^--N
Celery yields	0.88**	-0.91**	0.85**	0.94**	0.92**	0.72**	0.68*	0.91**	0.91**	0.91**	0.85**	0.76**	0.79**	0.88**	0.85**	0.65*	0.86**	0.12	0.86**	0.91**	0.62*	0.47
Tomato yields	0.93**	-0.89**	0.91**	0.96**	0.96**	0.79**	0.70*	0.92**	0.94**	0.93**	0.91**	0.82**	0.87**	0.90**	0.88**	0.74**	0.89**	0.23	0.92**	0.92**	0.60*	0.43

Note: Gmea , SOC soil organic C, NO_3^--N nitrate-N, NH_4^+-N ammonium-N.