Table S1. Drip fertigation methods.

Fertilizer	Fertilization at each growth stage				
	Before sowing	Jointing stage	Silking stage	Flowering stage	Filling stage
N fertilizer	30%	30%	20%	10%	10%
P fertilizer	50%	20%	15%	10%	5%
K fertilizer	50%	20%	15%	10%	5%

Table S2. The correlation analysis among soil properties and soil enzymes under different N application rates.

	NXR	SOM	pH	AN	TN	NH_4^+-N	NO_3^--N
NXR	1	0.72**	-0.31	0.69**	0.80**	0.69**	0.85**
SOM		1	-0.27	0.82**	0.85**	0.74**	0.73**
pH			1	-0.69**	-0.56	-0.44	-0.54*
TN				1	0.92**	0.87**	0.85**
AN					1	0.78**	0.90**
NH_4^+-N						1	0.67
NO3¯-N							1

NXR, nitrite oxidoreductase; SOM, soil organic matter; TN, total nitrogen; AN, available nitrogen; NH_4^+-N, ammonium nitrogen; NO_3^--N, nitrate nitrogen. * indicates significance at $P < 0.05$, ** indicates significance at $P < 0.01$.

Table S3. Illumina MiSeq sequenced NOB data (at 97% sequence similarity) based on the *nxrB* gene.

Treatment	Sequences	OTU
N0-1	25406	595
N0-2	47285	281
N0-3	29845	222
N1-1	44848	243
N1-2	31326	424
N1-3	39722	290
N2-1	74367	201
N2-2	37994	794
N2-3	39722	324
N3-1	132242	316
N3-2	76527	416
N3-3	157437	345
N4-1	121792	585
N4-2	150995	275
N4-3	158026	511

N0, N1, N2, N3, and N4 represent N fertilizer being used at a level of 0, 90, 150, 210, and 270 kg ha^{-1}, respectively.

Table S4. The BLAST of NOB at NCBI.

OTU	Taxonomy	Identities(%)	Bit score	E-value	Accession NO.
OTU_112	*Nitrospira defluvii*	87.2	503	4.17E-141	FP929003.1
OTU_116	*Nitrospira moscoviensis*	90.2	592	5.20E-165	CP011801.1
OTU_117	Candidatus *Nitrospira_bockiana*	89.0	560	1.47E-155	KC884861.1
OTU_118	*Nitrospira moscoviensis*	90.4	593	1.45E-165	CP011801.1
OTU_13	*Nitrospira moscoviensis*	87.5	139	9.08E-29	CP011801.1
OTU_136	Candidatus *Nitrospira bockiana*	86.7	501	9.02E-138	KC884861.1
OTU_138	Candidatus *Nitrospira bockiana*	91.5	623	1.84E-174	KC884861.11
OTU_14	Candidatus *Nitrospira bockiana*	92.7	654	0	KC884860.1
OTU_15	*Nitrospira moscoviensi.*	90.4	595	4.03E-166	KC884855.1
OTU_154	*Nitrospira japonica*	893	569	2.44E-158	LT828648.1
OTU_16	*Nitrospira moscoviensis*	91.6	672	1.43E-175	KC884854.1
OTU_169	*Nitrospira moscoviensis*	92.0	636	2.37E-178	CP011801.1
OTU_17	*Nitrospira calid*	90.2	592	5.21E-165	KC884904.1
OTU_176	Candidatus *Nitrospira bockiana*	85.7	473	1.97E-129	KC884861.1
OTU_18	*Nitrospira moscoviensis*	88.1	543	8.91E-148	KC884854.1
OTU_182	*Nitrospira moscoviensis*	91.8	630	1.10E-176	CP011801.1
OTU_19	Candidatus *Nitrospira bockiana*	91.2	616	3.09E-172	KC884860.1
OTU_20	*Nitrospira calida*	78.8	91.2	1.92E-149	KC884904.1
OTU_203	*Nitrospira defluvi*	92.7	654	0	FP929003.1
OTU_21	*Nitrospira calida*	88.2	540	1.92E-149	KC884904.1

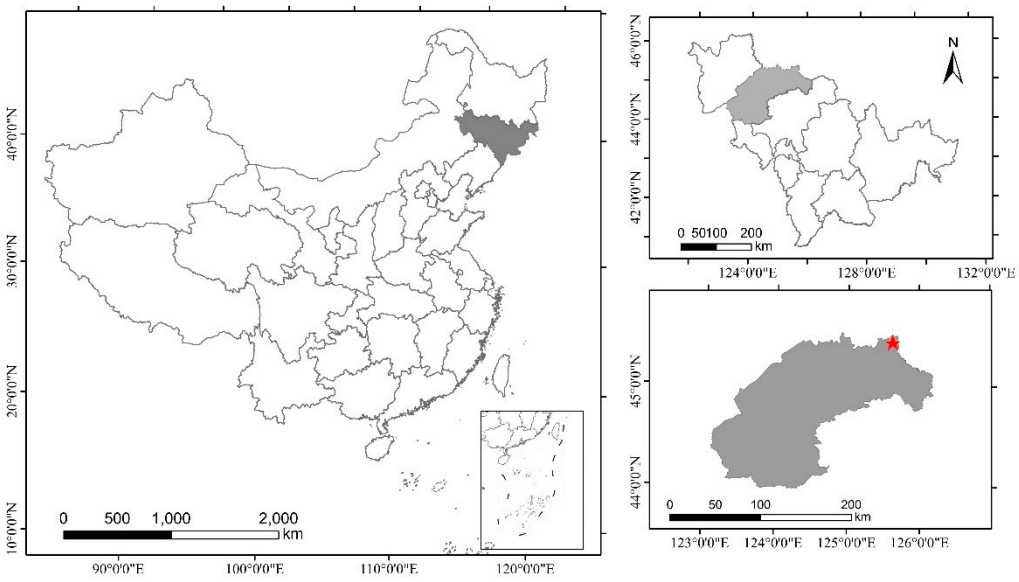


Figure S1. The map of experiment site.

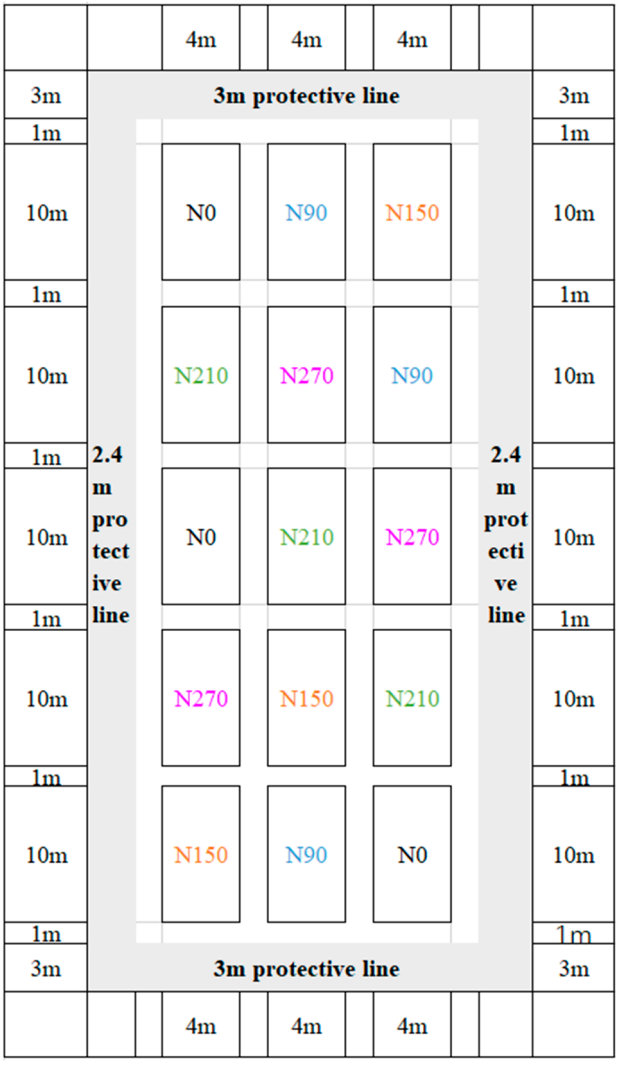


Figure S2. The plot experiment design.

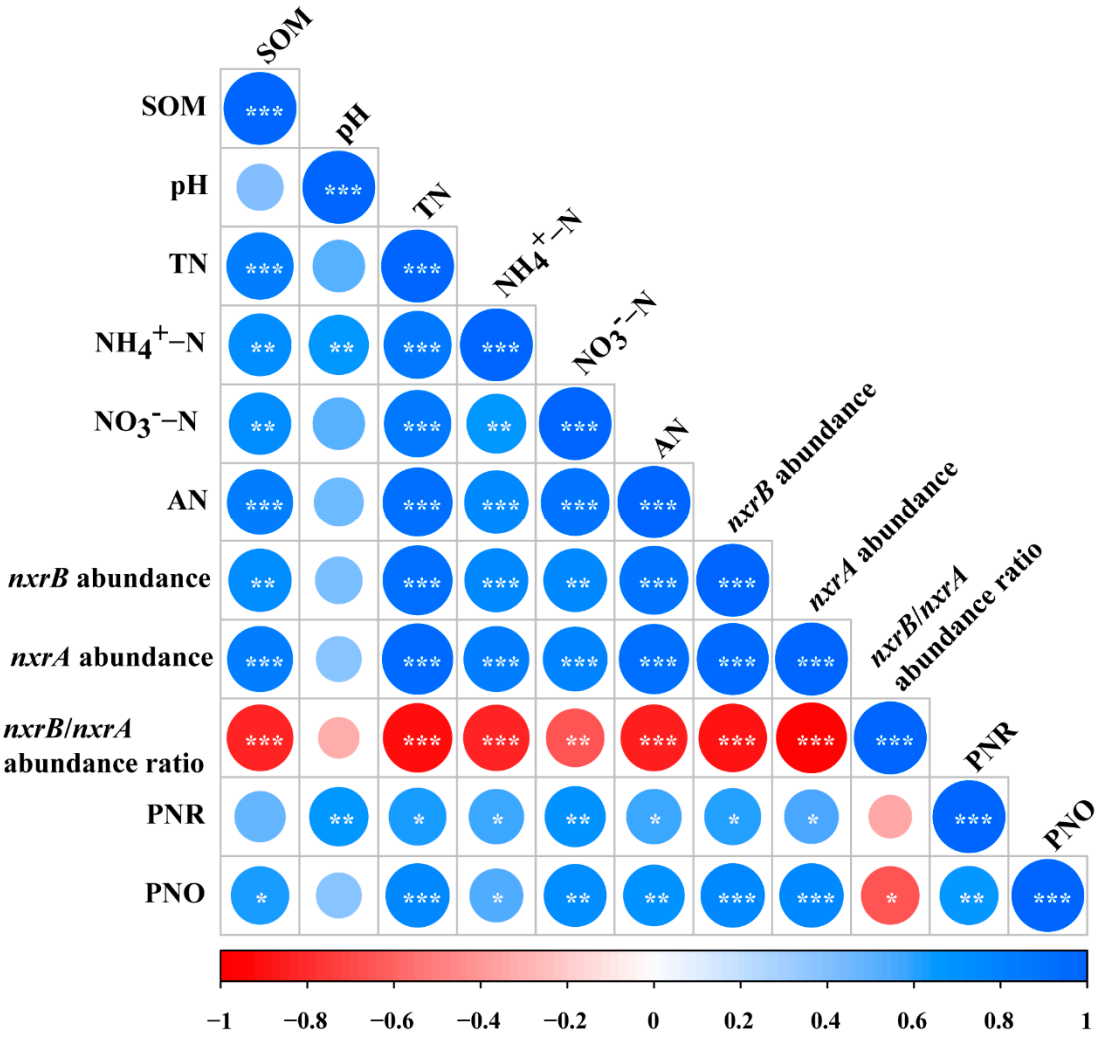


Figure S3. The correlation analysis among soil PNR, PNO, nitrification microbial abundance and soil properties under N application rates. SOM, soil organic matter; TN, total nitrogen; AN, available nitrogen; NH_4^+-N, ammonium nitrogen; NO_3^--N, nitrate nitrogen; PNR, potential nitrification rate. PNO, potential nitrite oxidation.