1. EDUCATION

- Ph.D., Ecology, 1996, Institute of Applied Ecology, CAS
- M.S., Agro-ecology, 1988, China Agricultural University
- B.S., Agronomy, 1985, Shanxi Agricultural University

2. PROFESSIONAL EXPERIENCE

- **May 2014-present** Deputy Director of Institute of Genetics and Developmental Biology, Chinese Academy of Sciences (CAS); Director of Center for Agricultural Resources Research
- **2004-February 2010** Assistant Director of Center for Agricultural Resources Research, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences (CAS); Deputy Director of Center for Agricultural Resources Research
- **1998-present** Head of Luancheng Agro-Ecosystems Experimental Station, Chinese Academy of Science
- **1997-present** Professor of Institute of Agricultural Modernization, CAS and Institute of Genetics and Developmental Biology, CAS.
- **1996-1997** Associate Professor of Institute of Agricultural Modernization, CAS
- **1990-1995** Assistant Professor of Institute of Agricultural Modernization, CAS
- **1988-1990** Research assistant of Institute of Agricultural Modernization, CAS

3. HONORS AND ACADEMIC AWARDS

HONORS

(1) National Excellent Scientist (China Association for Science and Technology) 2010

(2) Outstanding Field Scientist of China (Ministry of Science and Technology) 2009

(3) Excellent Scientist of Hebei Province (Provincial Organization Department) 2009

ACADEMIC AWARDS

(1) “Establishing of Chinese Ecosystem Research Network (CERN) and its monitoring study and experimental demonstration”.

Second Prize of National Science and Technology Progress，2012.

One of the principal persons who completed the project

(2) “Integration and demonstration of conservational tillage in water deficient regions in North China Plain”.

First Prize of National Science and Technology Progress, 2013.

The leader of the project.

(3) “Integration and demonstration of the key technologies of precision agriculture for the key crops in Hebei Province”.

Second Prize of Science and Technology Progress of Hebei Province, 2009.

The leader of the project.

(4) “Development and application of precise corn seeder for deep tillage”

Third Prize of Science and Technology Progress of Hebei Province, 2012.

The fourth person who complete the project.

4. MAJOR RESEARCH INTERESTS，SELECTED RESEARCH PROJECTS, Research background, Major research achievements, Current research and future directions

The research group focuses on nutrient cycling and its environmental effects in agricultural ecosystem. A series of research progress has been achieved in soil denitrification, greenhouse gas emission and nitrate leaching during 2009 to 2013.

4.1 Research progresses on soil denitrification process

4.1.1 New technology for soil denitrification study

Soil denitrification refers to the microbial process by which nitrate is reduced into N_2O and/or N_2. Soil denitrification plays important role in nutrient cycling in ecosystems. Denitrification in agricultural soils decreases use efficiency of nitrogen fertilizer and increases N_2O emission. Therefore, more and more attention has been given to denitrification in agricultural soils. Direct determination of gross N_2 emission from soils is difficult due to the high background concentration of atmospheric N_2. As an alternative, the acetylene inhibition technology has been widely applied for soil denitrification studies. The acetylene inhibition technology has been reported to incompletely inhibit soil N_2O reductase activity, resulting in underestimation of soil denitrification.

We evaluated the bias of acetylene inhibition technology using an auto-sampling and analyzing system for soil gas fluxes, such as N_2, N_2O and NO. The results showed that the widely used acetylene inhibition technology had significant bias (Table 1) (Qin *et al.*, 2012). The bias of acetylene inhibition technology showed significant negative correlation with soil organic carbon, nutrients and clay contents (Qin *et al.*, 2013). The direct determination of soil N_2 emission was useful for soil denitrification studies, e.g., soil denitrification potential and soil N_2O reductase activity determinations (Qin *et al.*, 2014). Furthermore, we developed isotopic and buffer-gas methods for *in situ* N_2 flux monitoring, which can be used for undisturbed *in-situ* N_2 fluxes determination at field scale. These methods provide a promise approach to break through the bottle neck for denitrification and global nitrogen budget studies.

Table 1 Gas emissions from soils with or without acetylene

Gas emission rates	With 10% acetylene	Without acetylene
N_2 (μ mol g^{-1} h^{-1})	0.017 ±0.005 a	0.071 ±0.005 b
N_2O (μ mol g^{-1} h^{-1})	0.127 ±0.013 b	0.060 ±0.006 a
N_2 + N_2O (μ mol g^{-1} h^{-1})	0.144 ±0.016 a	0.131 ±0.008 a
$N_2/(N_2 + N_2O)$ ratio (%)	11.7% ±2.5% a	54.4% ±2.6% b

Different letters in the same column indicate significant statistical difference at $p < 0.05$

The above results have been published in Soil Biology and Biochemistry.

Shuping Qin, Chunsheng Hu, Oene Oenema，2012. Quantifying the uncertainties in soil denitrification potential as determined by the acetylene inhibition method. *Soil biology and biochemistry* 47，14-17.

Qin, S., Yuan, H., Dong, W., Hu, C., Oenema, O., Zhang, Y., 2013. Relationship between soil properties and the bias of N_2O reduction by acetylene inhibition technique for analyzing soil denitrification potential. Soil Biology and Biochemistry 66, 182-187.

Qin, S., Yuan, H., Hu, C., Oenema, O., Zhang, Y., Li, X., 2014. Determination of potential N_2O-reductase activity in soil. Soil Biology and Biochemistry 70, 205-210.

4.1.2 Contribution of denitrification to N_2O emission from agricultural field

We evaluated the relative contributions of soil denitrification and nitrification to N_2O emission using the $^{15}NO_3^-$ tracer method. The results showed that denitrification accounted for 7-72% of N_2O emission for the winter-wheat – summer-corn double cropping system in the North China Plain. Denitrification dominated N_2O emission (>50%) under non-tillage with residue return. On the contrary, nitrification dominated N_2O emission under mould-board tillage (Table 2).

Table 2. Contributions of denitrification to N_2O emission under different tillage.

	June	July	August	November
Mould-board tillage without residue return	0.23b	0.34 a	0.07 c	0.2 b
Mould-board tillage with residue return	0.44ab	0.4 a	0.08 c	0.23 ab
Reduced tillage with residue return	0.5ab	0.54 a	0.1 c	0.51 a
Non-tillage with residue return	0.72a	0.57 a	0.67 a	0.2 b

Different letters in the same column indicate significant statistical difference at $p < 0.05$

The mineralization rate and water content were significantly correlated with N_2O emission and its relative contributions from nitrification and denitrification, respectively (Table 3), indicating mineralization and water content play significant role in regulating soil N_2O emission.

Table 3 Correlation between N_2O emission and other parameters

	N_2O	d-N_2O	n-N_2O	r	m	n	w	CO_2
N_2O	1							
d-N_2O	0.860**	1						
n-N_2O	0.967**	0.702**	1					
r	0.033	0.321**	-0.116	1				
m	0.342**	0.264*	0.344**	0.081	1			
n	-0.058	0.079	-0.123	0.412**	-0.083	1		
w	0.340**	0.274*	0.337**	0.334**	0.340**	-0.106	1	
CO_2	0.640**	0.593**	0.600**	0.296*	0.473**	0.089	0.196	1

d-N_2O: N_2O emission resulted from denitrification; n-N_2O: N_2O emission resulted from nitrification; r: percentage of N_2O emission resulted from denitrification; m: mineralization rate; n: nitrification rate; w: water content

The above results provide theoretical basis for reducing N_2O emission in North China Plain. These results have been published in Nutrient Cycling in Agro-ecosystems.

Dong, W., Hu, C., Zhang, Y., Wu, D., 2012. Gross mineralization, nitrification and N_2O emission under different tillage in the North China Plain. Nutrient Cycling in Agro-ecosystems 94, 237-247.

4.1.3 Mechanisms for denitrification in deep soil

We investigated the effects of dissolved organic carbon addition on denitrification in 0-12 m soil profile under different nitrogen fertilizer treatments. Samples (0-12 m) were taken from N fertilization treatments (0, 200, 400, 600 kg N ha^{-1} yr^{-1}) of a long-term field experiment at the Luancheng Agroecosystem Experimental Station (37.900 N, 114.670 E, elevation 50 m), using the Geoprobe (USA, 54DT). The station is located at the piedmont of the Taihang Mountains, in the North China Plain.

The results showed that 1): the background denitrification rates were very low under all of the long-term nitrogen treatments. Long-term application of different amount of nitrogen fertilizer had no significant effects on the background denitrification. 2): dissolved organic carbon deficiency was one of the key factors limiting deep soil denetrification. 3): addition of dissolved organic carbon into the deep soil significantly increased the denitrification rate and decreased N_2O emission (Fig. 1).

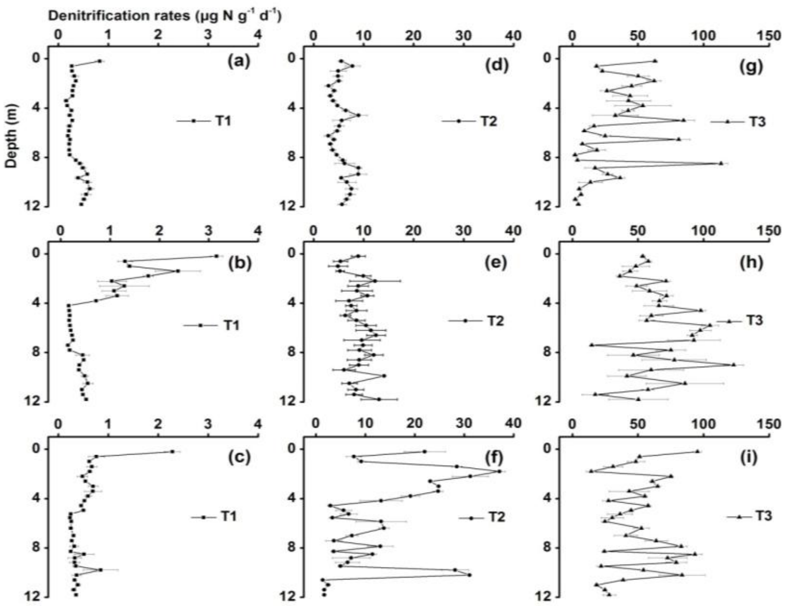

Fig. 1 Background denitrification rate and the responses of denitrification to addition of dissolved organic carbon under long-term different amount of nitrogen treatment.

4.2 Agricultural soil N_2O emission and its microbial regulation

4.2.1 N_2O emission from non-fertilized farmland in the Taihang mountain areas

We monitored the N_2O flux from the non-fertilized and non-irrigated farmland planted with corn (Zea mays L.) in the Taihang mountain region (114°15′50″E, 37°52′44″N) using the static chamber method. As showed in the Fig. 2, the field investigated was a significant sink of N_2O. The peak of sink (161μg N m^{-2} h^{-1}) was observed on 10th April, 2012. Then the sink of N_2O gradually decreased from the early May to early June, ranged from 62 to 92 μg N m^{-2} h^{-1}. The decrease in N_2O diffusion and increase in N_2O reduction could account for the seasonal trend of N_2O flux. The atmospheric concentration of N_2O in this area ranged 400-1160 ppbv, which was significantly higher than the normal level (Fig 2). The peak of atmospheric concentration of N_2O was observed also in April, 2012, probably resulted from the nitrogen fertilization and irrigation in the farmlands around the study area, which promoted N_2O emission.

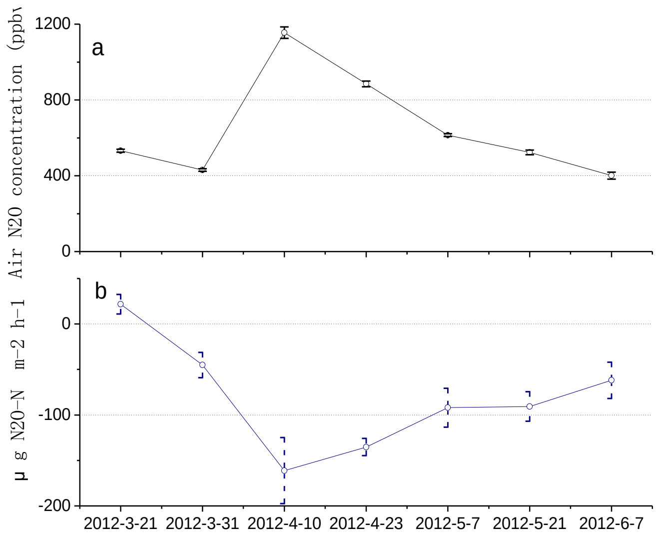

Fig. 2 seasonal dynamics of N_2O flux and atmospheric N_2O concentration in the non-fertilized and non-irrigated farmland in the Taihang mountain region.

4.2.2 N_2O emission from wheat-corn double cropping system in the North China Plain

We investigated the responses of yield-scaled N2O emission to different amount of nitrogen fertilizer in the North China Plain. The yield-scaled N_2O emissions were shown to be cubic functions of N fertilizer rates (Fig. 3); emissions were lowest at application rate of 200 kg ha^{-1} yr^{-1} and highest at application rate of 600 kg ha^{-1} yr^{-1}. Using a cubic model, we estimated that the lowest yield-scaled N_2O emissions were achieved at fertilizer application rates of 136 to 138 kg N ha^{-1} yr^{-1}. Evidently, using N uptake in grain or N uptake in total aboveground biomass made not much difference for identifying the N fertilizer level with the lowest yield-scaled N_2O emissions. The results were helpful for optimizing nitrogen fertilization, reducing N_2O emission and achieving sustainable agriculture. The results have been published in Atmospheric Environment.

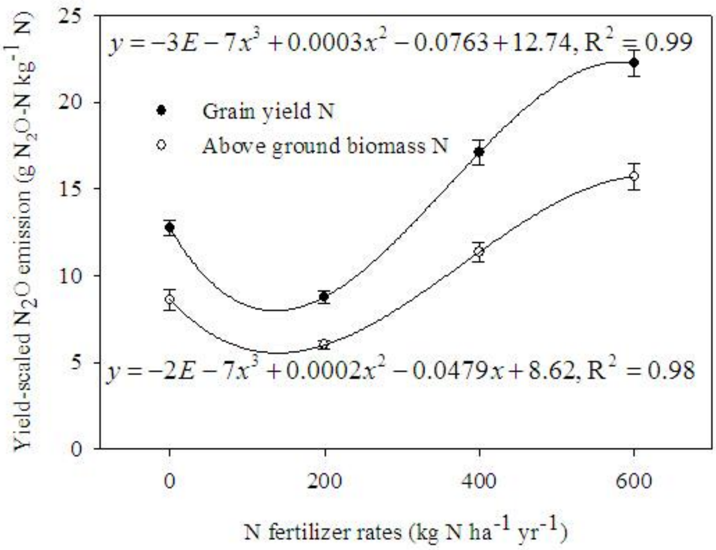

Fig. 3 responses of yield-scaled N_2O emission to different amount of nitrogen fertilizer

Shuping Qin，Yuying Wang, Chunsheng Hu，Oene Oenema， Xiaoxin Li， Yuming Zhang， Wenxu Dong, 2012. Yield-scaled N_2O emissions in a winter wheat-summer corn double-cropping system. Atmospheric Environmen 55. 240-244.

4.2.3 Responses of N_2O emission to carbon addition in the wheat-corn double cropping system in the North China Plain

We investigated the effects of dissolved organic carbon addition on the denitrification process through field experiment. The results showed that denitrifiaction rate was significantly higher in corn season than in wheat seanson. Corn season was the dominant season for N_2O emission. Field addition of dissolved organic carbon (glucose) significantly increased denitrification rate in fertilized field but not in non-fertilized filed. For the fertilized field, the effects of dissolved organic carbon addition reached as deep as 165 cm. Denitrification rate was significantly decreased with the increasing soil depth, differences were observed in different soil layers (Table 4).

Table 4 Denitrification rate in 0-190 cm soil profile

Treatments		Denitrification rate（kg N_2O-N/ha/yr）								
		0-15	15-40	40-65	65-90	90-115	115-140	140-165	165-190	total
Wheat season	CK	0.30b	0.16b	0.08a	0.05b	0.03b	0.03c	0.03b	0.06b	0.74c
	CCK	0.33b	0.16b	0.10a	0.04b	0.05b	0.05c	0.05b	0.08b	0.86c
	N4	0.75a	0.21ab	0.27a	0.08a	0.06b	0.36b	0.18a	0.17a	2.22b
	CN4	0.77a	0.30a	0.19a	0.06ab	0.12a	0.67a	0.17a	0.108a	2.63a
Corn season	CK	0.91c	0.90c	0.42b	0.13b	0.12b	0.90c	0.09b	0.04b	3.50c
	CCK	0.36c	1.88b	0.32b	0.10b	0.09b	0.73c	0.05b	0.07b	3.59c
	N4	5.81b	2.04b	0.53b	0.18b	0.15b	6.41b	0.18b	0.12a	17.13b
	CN4	14.31a	3.25a	2.29a	0.36a	0.36a	7.70a	0.43a	0.19a	33.27a

Different letters in the same column indicate significant statistical difference at $p < 0.05$

4.2.4 Mechanisms in N_2O production and reduction in soil

Agricultural soil is one of the key emitters of global atmospheric N_2O. The N_2O

fluxes from agricultural soils were widely monitored all over the world. However, less attention was paid to the N_2O production and reduction in soil. We monitored the seasonal dynamics of N_2O concentration in soil profiles in the North China Plain. Concentrations of N_2O were strongly influenced by agricultural management activities such as N application and irrigation. Fertilizer N applications increased soil nitrate concentration and consequently increased N_2O concentration in soil profile. For the non-fertilized control treatment, the mean N_2O concentrations at depth of 10, 20, 30, 60, 90, 150, 210, 250 and 300 cm was 590,940, 1033, 1010, 992, 1180, 1145, 1059, 1293 and 1121 ppbv, respectively (Fig. 5). For the treatment of 400 kg N ha^{-1} yr^{-1}, irrigation and fertilization promoted N_2O concentration in soil profile as deep as 250 cm. The N_2O concentration in surface layer (0-30 cm) responded quickly to irrigation and fertilization. A lag was observed in the responses of N_2O concentration subsoil (60-250cm) to irrigation and fertilization. The above results had been published in Agriculture, Ecosystems and Environment and Plos One.

Y.Y. Wang, C.S. Hu, H. Ming, Y.M. Zhang, X.X. Li, W.X. Dong, O. Oenema. Concentration profiles of CH4, CO2 and N2O year. Agriculture, Ecosystems and Environment 164 (2013) 260– 272.

Wang, Y., Hu, C., Ming, H., Oenema, O., Schaefer, D.A., Dong, W., Zhang, Y., Li, X., 2014. Methane, Carbon Dioxide and N2O Fluxes in Soil Profile under a Winter Wheat-Summer Maize Rotation in the North China Plain. PLOS ONE 9, e98445.

We conducted further investigations on the microbial mechanisms of soil N2O reduction. The results showed that soil can take up N_2O from the atmosphere and reduce it to N_2 under dry and oxic conditions (Fig. 4). The observed uptake rate of N2O and the emission rate of N2 accounted for the negative flux of N2O from soil into atmosphere in the field. The above results have significance for understanding negative N2O fluxes from soils and for mitigating N2O emission from agricultural soils.

The above results have been published in Soil Biology and Biochemistry.

Wu, D., Dong, W., Oenema, O., Wang, Y., Trebs, I., Hu, C., 2013. N_2O consumption by low-nitrogen soil and its regulation by water and oxygen. Soil Biology and Biochemistry 60, 165-172.

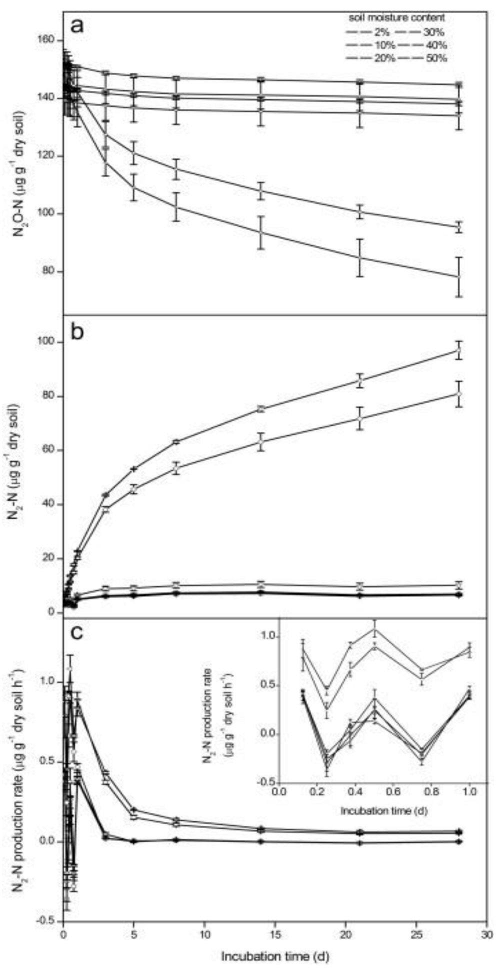

Fig. 4.Soil N_2O reduction under aerobic condition

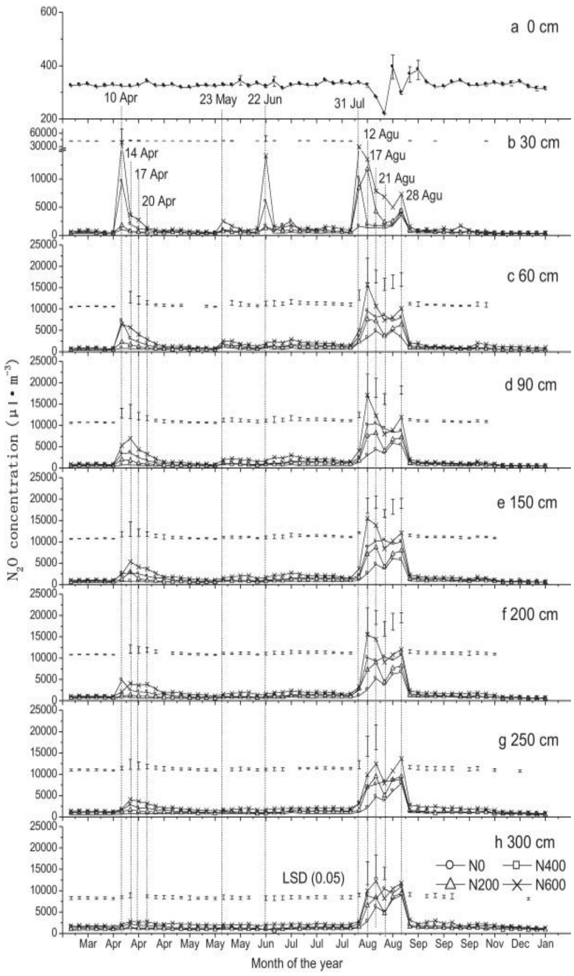

Fig. 5. N_2O concentration in soil profile

4.3 Nitrate leaching from agriculture field under wheat-corn double cropping system

We investigated the responses of soil nitrate leaching to fertilization and irrigation. The results showed that the nitrate accumulation in 0-120 cm was significantly lower under fertilization rate of 100 kg N ha^{-1} $year^{-1}$ than under 200 kg N ha^{-1} $year^{-1}$. For fertilization rate of 200 kg N ha^{-1} $year^{-1}$, the peak of nitrate concentration in soil profile was significantly affected by irrigation frequency. The depth of nitrate peak in soil profile for non-irrigation, irrigating twice and irrigating thrice was 60-80 cm, 80-100 cm and 120-140 cm, respectively (Fig. 6). These results indicated that reducing irrigation could significantly promote root growth and decrease nitrate leaching.

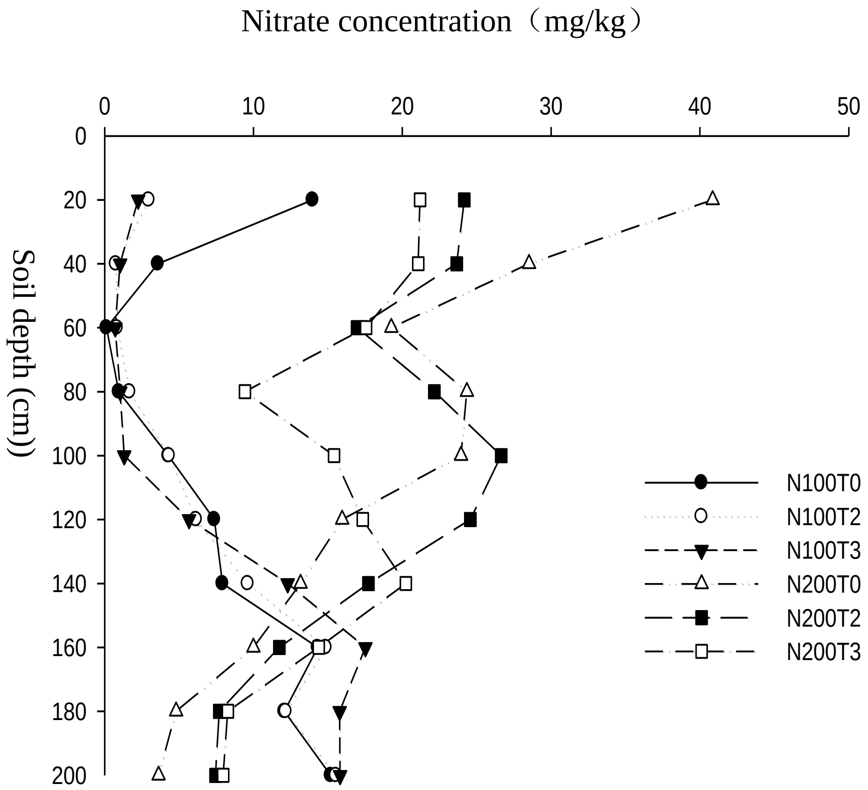

Fig. 6 Distribution of nitrate in 0-200 cm soil profile

4.4 Warming and nitrogen fertilization effects on winter wheat yields in northern China varied between four years

Global warming is expected to exert significant effects on wheat productivity, but with large regional differences depending on current climatic conditions. Infrared heaters were applied above the crop and soil to provide a warming of around 2 ℃ at 5 cm soil depth during the whole winter wheat growing season from 2008 to 2012 at a site near Shijiazhuang in the North China Plain. Two temperature levels (warming and ambient) for winter wheat were compared in a factorial combination with (N1, 240 kg N ha^{-1} $year^{-1}$) and without nitrogen fertilizer (N0) in a field experiment. The study aimed to investigate how the wheat growth and development as well as yield and yield components respond to warming combined with nitrogen fertilization. Measurements showed that the infrared heater increased soil temperature by 1.6 to

2.2 ℃ in N1 and by 1.3 to 2.0 ℃ in N0 depending on soil depth (0.05 to 0.40 m). The volumetric water content decreased significantly before heading by 9.3, 3.9, 2.4 and 1.2 vol-% in the soil depth of 0.10, 0.20, 0.40, 0.60 m in N1 and by 5.9, 1.4, 1.3 and 1.2 vol-% in N0 compared with no heating. The duration of the entire growth period was shortened by on average 7 days in the warming compared with control treatment. The early growth stages before re-greening in spring were shortened by 12 to 18 days, whereas the later stages were prolonged by up to 6 days (Table 5). Warming reduced grain yield by 36%, 39% ($P<0.05$) and 12% for N1 and 33%, 7% and 10% for N0 in 2009, 2011 and 2012, respectively, which can be considered years with normal winter weather. However, warming increased grain yield by 1% and 31% ($P<0.05$) in N0 and N1, respectively, in a year with unusually cold and snowy conditions (2010). Warming increased plant height and 1000-grain weight, but reduced spike number per m2. This suggests that the wheat yield loss may be related to reduction of spike number, which was affected by decreased soil water content under warming. Warming tended to give larger yield reductions at higher nitrogen fertilizer rates, and this may be related to larger water consumption with both higher nitrogen and temperature leading to water shortages. These above indicate that wheat yield loss mainly caused by drought, which was affected by warming. Water shortage resulted in lower nitrogen utilization, leading to larger yield reduction in fertilized plots. Yield increased under warming when water was not a limited factor in an unusual cold and wet winter year.

Table5 Interval (days) between different growth stages during 2008-2012.

Year	Treatment	Sowing-regreen	Regreen-jointing	Jointing-heading	Heading-ripening
2008-09	control			25	50
	warming			30	55
2009-1	control	134	43	26	41

0					
	warming	122	45	28	43
2010-11	control	142	40	16	48
	warming	124	46	22	48
2011-12	control	148	34	21	43
	warming	136	37	22	44

The above results have been published in Field Crop Research.

Liu, L., Hu, C., Olesen, J.E., Ju, Z., Yang, P., Zhang, Y., 2013. Warming and nitrogen fertilization effects on winter wheat yields in northern China varied between four years. Field Crops Research 151, 56-64.

4. 5 The flux and cumulative loss of Ammonia Volatilization under different Tillage and Nitrogen Fertilization treatments

Urea was hydrolyzed into ammonia by soil urease after applying into the soil. Ammonia volatilization occurred quickly. The seasonal patterns of ammonia volatilization were different apparently for the three tillage treatments. As basal fertilizer for wheat, ammonia volatilization mainly occurs within the 5 d after fertilization, and achieved the peak (about 0.28-0.41 kg ha^{-1} d^{-1}) in 2-3 days after fertilization applied. There was no significant difference of ammonia volatilization between samples and blank in 7 days after fertilization applied. Though for RT treatment, ammonia volatilization was larger than for the NT and CT treatments, there was no significant difference between among them as basal fertilizer for wheat. As top-dress for wheat, ammonia volatilization arrived the peak (about 3.6 kg ha^{-1} d^{-1} for NT) in 2 days after applied, and then the volatilization rates drops rapidly, at low volatility (0.30-0.66 kg ha^{-1} d^{-1}) within 3-8 d, and can not be detected after 9 day from all treatments. For NT treatment ammonia volatilization rate is significantly higher than RT and CT in the 4 days after top-dress fertilization for wheat (Fig. 7). As top-dress for corn, ammonia volatilization rate reached the maximum in the day of fertilizer applied, in which for NT is the biggest (9.9 kg ha^{-1} d^{-1}), three times higher than in top-dress for wheat. Similar to wheat fertilizer, for NT treatment ammonia volatilization rate is higher than RT and CT in the 2 days after top-dress fertilization for corn, but no significant difference with the RT. In the winter wheat-summer corn cropping season, the cumulative NH_3 volatilizations of two seasons was 15.8, 18.4 and 28.6 kg ha^{-1} under CT, TR and NT, accounting for 4.9%, 5.7%, and 8.8% of the applied fertilizer, respectively. Laboratory incubation study showed that higher urease activity in surface soil resulted in rapid urea hydrolysis, which stimulated NH_3 volatilization under NT. In the North China Plain, soil under NT soils are prone to NH_3 volatilization following surface application of urea, and one-time deep application of nitrogen is recommended for reducing ammonia volatilization under no-tillage system.

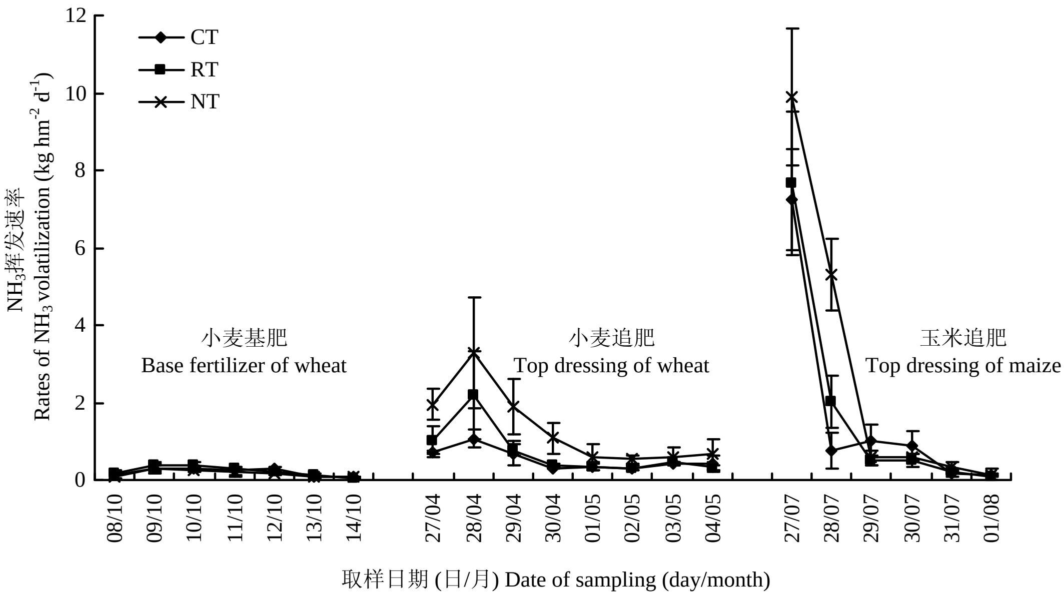

Fig. 7 Ammonia volatilization rates under different tillage

5. Funding and laboratory personnel (2009-2013).

5.1 Funding

Title of project	Leader	Financial Support	Start	End	Funding (×10,000 Yuan)
Integration and demonstration of the	Chunsheng Hu	National Science and Technology	2013-1-1	2017-12-31	235

key technologies of shallow salt water irrigation for crop yield increase		Support Programme of China, Ministry of Science and Technology of China			
Conservational and highly productive agriculture in semiarid area in Kenya	Chunsheng Hu	Bureau of International Cooperation, Chinese Academy of Sciences	2013-10-1	2015-12-31	260
Experimental and modeling study for increasing crop yield and decreasing the consumption of water and nitrogen fertilizer	Chunsheng Hu	National Science and Technology Support Programme of China, Ministry of Science and Technology of China	2013-1-1	2015-12-31	100
Study and demonstration of the regulating technologies of soil nutrients targeted release from fertilizers for wheat and corn growth	Chunsheng Hu	National Science and Technology Support Programme of China, Ministry of Science and Technology of China	2012-1-1	2016-12-31	180
Study on the potential and rate of soil carbon sequestration in North China	Chunsheng Hu	Strategic leading science and technology projects, Chinese Academy of Sciences	2011-1-1	2015-12-31	170
Integration and demonstration of salt water saving irrigation in the low plains surrounding Bohai sea	Chunsheng Hu	Ministry of Science and Technology of China	2011-1-1	2012-12-31	100
Effects of agricultural managements on Groundwater recharge and solute transport in the intensive agricultural region in Haihe basin	Chunsheng Hu	National Natural Science Foundation of China	2009-12-1	2012-12-31	44.6
Soil nitrate transportation	Chunsheng Hu	Chinese Academy of Sciences	2009-1-1	2011-12-31	65
Control non-point source polluti on in the plain areas	Chunsheng Hu	Major Science and Technology Project of Water Pollution Control and Management in China	2008-1-1	2010-12-31	40

Mechanized straw return into agricultural soils	Chunsheng Hu	Science and Technology Support Programme of Hebei Province	2009-1-1	2010-12-31	58
Mechanized seeding and water and fertilizer regulations for high crop yiled	Yuming Zhang	Chinese Academy of Sciences	2013-1-1	2015-12-31	30
N2O diffusion and reduction in soils	Yuming Zhang	National Natural Science Foundation of China	2009-9-1	2012-12-31	30
Pollution reducing in Baiyangdian Basin	Yuming Zhang	National Natural Science Foundation of China	2009-1-1	2011-12-31	25
Carbon and water fluxes from agricultural fields in Luancheng County	Yuying Wang	973 Project, Ministry of Science and Technology of China	2010-1-1	2014-12-31	10
Foundation of Youth Innovation Promotion Association	Shuping Qin	Chinese Academy of Sciences	2013-1-1	2016-12-31	40
Mechanisms of soil N2O sink regulated by Eh spatial heterogeneity in soil microzone	Shuping Qin	National Natural Science Foundation of China	2014-1-1	2016-12-31	24
Process of dissolved organic carbon infiltration and its mechanisms for strengthening soil denitrification beneath root zone	Shuping Qin	National Natural Science Foundation of China	2013-1-1	2016-12-31	69
Integration and demonstration of technology for wheat and corn straw decomposer	Wenxu Dong	National Science and Technology Support Programme of China, Ministry of Science and Technology of China	2012-1-1	2016-12-31	180
Crop uptake of nutrients from deep soil	Xiaoxin Li	Chinese Academy of Sciences	2011-1-1	2013-12-31	30
Fluxes of pollutants in Baiyangdian basin	Xiaoxin Li	Chinese Academy of Sciences	2009-1-1	2011-12-31	25
Total					1535.6

5.2 Laboratory personnel

5.2.1 Staff

Principal Investigator (PI): Chunsheng Hu

Associate Professor: Yuming Zhang，Xiaoxin Li，Shuping Qin，Yuying Wang

Assistant Professor: Wenxu Dong

Research Assistant: Wenyan Wang

Technician: Xicui Zhang, Liying Dong，HongHong Hu

5.2.2 Student

Ph. D Student: Haijing Yuan，Dianming Wu, Kiril Manevski

Master Student; Jiazhen Li，Tuo Chen

6. SELECTED PUBLICATIONS, PATENTS GRANTED，VARIETIES OBTAINED, major invited international conference talks (2009-2013）

6.1 Papers

1. W. X. Dong, C. S. Hu, S. Y. Chen, Y. M. Zhang, Tillage and residue management effects on soil carbon and CO_2 emission in a wheat-corn double-cropping system. *Nutr Cycl Agroecosyst* **83**, 27 (Jan, 2009).
2. Z. Q. Ju, T. S. Ren, C. S. Hu, Soil Thermal Conductivity as Influenced by Aggregation at Intermediate Water Contents. *Soil Science Society of America Journal* **75**, 26 (Jan, 2011).
3. L. T. Liu *et al.*, Warming and nitrogen fertilization effects on winter wheat yields in northern China varied between four years. *Field Crops Research* **151**, 56 (Sep, 2013).
4. S. P. Qin, W. X. Dong, C. S. Hu, Tillage Affecting the Turnover Rate of Soil Urease:Implications for Enzyme Assays and Ecological Modeling.. *Fresenius Environmental Bulletin* **19**, 717 (2010).
5. S. P. Qin, X. H. He, C. S. Hu, Y. M. Zhang, W. X. Dong, Responses of soil chemical and microbial indicators to conservational tillage versus traditional tillage in the North China Plain. *European Journal of Soil Biology* **46**, 243

(May-Aug, 2010).

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11. S. P. Qin *et al.*, Relationship between soil properties and the bias of N_2O reduction by acetylene inhibition technique for analyzing soil denitrification potential. *Soil Biology & Biochemistry* **66**, 182 (Nov, 2013).
12. R. F. Wang *et al.*, Relationship between nitrogen uptake and use efficiency of winter wheat grown in the North China Plain. *Crop & Pasture Science* **62**, 504 (2011).
13. Y. Wang, C. Hu, B. Zhu, H. Xiang, X. He, Effects of wheat straw application on methane and N2O emissions from purplish paddy fields. *Plant Soil and Environment* **56**, 16 (Jan, 2010).
14. Y. Wang, C. S. Hu, W. X. Dong, Relationship Between Soil Nutrients and Soil Microbial Biomass, Structure and Diversity under Different Tillage Management in Wheat-Corn Double-Cropping system. *Fresenius Environmental Bulletin* **20**, 1711 (2011).
15. Y. Y. Wang *et al.*, Concentration profiles of CH_4, CO_2 and N_2O in soils of a wheat-maize rotation ecosystem in North China Plain, measured weekly over a

whole year. *Agriculture Ecosystems & Environment* **164**, 260 (Jan, 2013).

16. D. M. Wu *et al.*, N_2O consumption by low-nitrogen soil and its regulation by water and oxygen. *Soil Biology & Biochemistry* **60**, 165 (May, 2013).
17. W. Zhou *et al.*, Natural N-15 Abundance in Winter Wheat Amended with Urea and Compost: A Long-Term Experiment. *Pedosphere* **23**, 835 (Dec, 2013).
18. W. Zhou, C. S. Hu, J. Li, P. Christie, X. T. Ju, Natural N-15 abundance of tomato and soil amended with urea and compost. *Journal of Food Agriculture & Environment* **10**, 287 (Jan, 2012).

6.2 Patents granted

1、A continuous spot seeder(invention patent)

2、A adjustable deep tillage and fertilizer distributor(utility-model patents)

3、A device of making purity of the gas sample volume(utility-model patents)

4、A method of making stable vermis kinase granular fertilizer (utility-model patents)

5、A method of making vermis kinase compound (utility-model patents)

6.3 Local standards of Hebei province

(1) Technical standards for Mechanized crushing and returning straw (DB13/T1045-2009)

(2)Technical standards for conservational tillage under wheat-corn double cropping system (DB13/T1299-2010)

(3)Technical standards for Mechanized deep tillage (DB13/T 1478—2011)

7. Editorial duties

- 2009-　Associate Editor　Journal of Soil and Water Conservation (US)

8. Conference organization

1) 2010-，International Society of Precision Agriculture，Representative of China
2) October 22-24, 2013, Chair the Sino-German Workshop on Water Resource under Stress: Facing Challenges of Land Use and Climate Change, Shijiazhuang

3) June 6-13, 2014, 20th World Congress of Soil Science, Chair the Workshop on strategy to improve crop production.