附件 2:

实验室类别	重点实验室
所属领域	农业

江苏省高校重点实验室考核验收报告

（2015 年 1 月——2017 年 12 月）

实验室名称：低碳农业与温室气体减排重点实验室

实验室主任：邹建文

实验室联系人：李舒清

联系电话：**025-84396286**

E-mail 地址：**jwzou21@njau.edu.cn**

依托单位名称（盖章)：南京农业大学

依托单位管理部门联系人：李井葵

联系电话：**025-84399009**

2018 年 4 月 20 日填报

一、简表

实验室名称	低碳农业与温室气体减排重点实验室				
研究方向 (据实增删)	研究方向 1	土壤碳氮循环与温室气体减排			
	研究方向 2	气候变化对农业的影响与应对			
	研究方向 3	农业生物质循环利用与低碳途径			
	研究方向 4	低碳农业的土壤微生物生态学机制			

实验室主任	姓名	邹建文	研究方向	土壤碳氮循环与全球变化		
	出生日期	1971.06.14	职称	教授	任职时间	2010
学术委员会主任	姓名	朱兆良	现从事专业	农业资源与环境		
	出生日期	1932.08.21	职称	院士	任职时间	2010

研究水平与贡献	论文与专著	发表论文	261 篇	其中	SCI	184 篇	EI	篇	
		人均论文 (SCIE+EI)/实验室人员数				6.0 篇/人	篇均他引	3.8 次	
							单篇最高他引次数	63 次	
		科技专著	国内出版			1 部	国外出版	1 部	
	成果奖励	国家级科学技术奖	一等奖及以上			0 项	二等奖	1 项	
		省部级科学技术奖	一等奖及以上			1 项	二等奖	0 项	
		市（厅）级科学技术奖	一等奖及以上			0 项	二等奖	0 项	
		社会力量奖	一等奖及以上			0 项	二等奖	0 项	
	争取科技经费	到账总经费						8566 万元	
		纵向经费	8321 万元	横向经费	245 万元	人均经费 (纵向+横向)/实验室人员数		285.5 万元/人	
	发明专利与成果转化	发明专利	申请数			5 项	授权数	5 项	
		专利实施与许可	0 件			专利实施与许可使用费		0 万元	
		成果转化	转化数			3 项	转化总经费	245 万元	
	标准与规范	国家标准				0 项	行业/地方标准	1 项	
	实验室面积	2500M^2	设备原值					2112 万元	
	代表性研究成果 (不超过 5 项)	**序号**	**成果名称**				**成果形式**		
		第 1 项	有机肥作用机制和产业化关键技术研究与推广				国家科技进步二等奖/农业部创新团队奖		
		第 2 项	方向带头人和青年骨干入选多项国家和省部级人才计划				杰出人才-国家万人计划领军人才、千人计划特聘专家、省 333 工程第二、三层次等		
		第 3 项	全球土壤 NO 和 NO+N_2O 排放的数据集成研究				论文-发表在环境科学领域国际权威期刊 Global Change Biol.（2017, IF_{5-yr}=9.454）上		
		第 4 项	农业废弃物生物质炭利用及其对土壤有机碳库的影响研究				论文-两篇论文发表在农学综合类权威期刊 GCB Bioenergy（2016，IF_{5-yr}=5.434）上，两篇论文都入选 ESI 高被引论文。		
		第 5 项	农业淡水养殖湿地温室气体排放观测研究				论文-论文发表在环境领域重要期刊 Environ Sci & Technol (2016，IF_{5-yr}=6.96)上		

研究队伍建设	科技人员	实验室固定人员	30 人	实验室流动和兼职人员	7 人
		其中： 实验技术人员	3 人		
		行政管理人员	2 人		
		其中： 高级职称人员	21 人	其中： 高级职称人员	3 人
		中级职称人员	9 人	中级职称人员	4 人
		其他	人	其他	0 人
		其中： 大于 45 周岁	12 人	其中： 大于 45 周岁	1 人
		35—45 周岁	12 人	35—45 周岁	2 人
		其他	6 人	其他	4 人
		其中： 博士学位	28 人	／	／
		硕士学位	2 人	／	／
	国际学术机构任职(据实增删)	**姓名**	**任职机构或组织**		**职务**
		邹建文	Scientific Reports、Heliyon 编委会		领域编辑
		潘根兴	国际生物质炭协会		董事会委员
		潘根兴	Global Change Biology Bioenergy 编委会		编委
		胡水金	美国生态学会亚洲分会		主席
		胡水金	PLoS ONE、Journal of Plant Ecology 编委会		编委
	访问学者	国内	3 人	国外	1 人
	博士后研究人员	进站博士后	3 人	出站博士后	2 人

学科发展与人才培养	依托学科	学科 1	农业资源与环境	学科 2	生态学	学科 3	环境科学与工程
	博士研究生	毕业学生数		27 人	在读学生数		24 人
	硕士研究生	毕业学生数		86 人	在读学生数		78 人
	联合培养研究生	校内跨院系	0 人	与企业/科研院所	0 人	国际联合培养	6 人
	依托学科 ESI 排名		依托学科农业资源与环境位列全球生态环境学科领域 ESI 前 1%				

开放交流与运行管理	承办学术会议	国际	5 次	国内（含港澳台）	2 次	
	国际合作计划		2 项	国际合作经费	96 万元	
	依托单位经费投入		400 万元	实验室自筹经费投入	128 万元	
	参加国际学术会议	16 人次	国内学术会议	55 人次	三年共计召开实验室学术委员会议 3 次	
	实验室科普工作形式		开放日，三年累计向社会开放共计 9 天；科普宣讲，三年累计参与公众 450 人次；科普文章，三年累计发表科普类文章 5 篇；			
	实验室 3 年内安全事故		0 起	设立开放课题	3 项	

二、定位与研发条件

1．实验室定位

简要介绍实验室总体定位情况、在国家科技发展战略和地方科技需求的前沿领域研究情况，以及在国内外相同领域实验室中的地位和作用。(800 字以内)

江苏省低碳农业与温室气体减排实验室依托于南京农业大学农业资源与环境、生态学和环境科学与工程等学科优势力量。其中，农业资源与环境为国家一级重点学科、国家“双一流”建设学科和省优势学科，生态学和环境科学与工程分别为省重点学科和学校重点学科。该实验室凭借南京农业大学以农业和生命科学为主体的农业科学基础与优势，立足我国农业生产实际，面向农业与气候变化基础研究的国际前沿和国家应对气候变化的战略挑战，研究我国农田生态系统碳氮养分循环特点、温室气体产生及排放过程与机理，气候变化对农田生态系统(过程和功能）的影响及应对技术，农业废弃物资源化与低碳农业途径等基本问题，探索适合我国国情的固碳减排和增产增效的低碳农业模式和技术途径，着力构建具有地球科学与生命科学交叉学科特色、以减缓和应对气候变化的低碳农业发展为中心任务的研究平台，提高科研创新能力与人才培养质量，并成为我国高校专门从事农业与气候变化应对研究的知识创新和高层次人才培养基地，为未来农业可持续发展提供国家和江苏省的技术和决策支持。

当前，气候变化是国际社会密切关注的问题，而农业在控制温室气体排放上具有巨大潜力。中国是一个发展中的农业大国，面临着后京都时代温室气体减排的巨大压力。中国农业土地开发利用强度高、农业生产资料投入和能源消耗多，农业面源污染严重和农田温室气体排放规模大等问题历来受到发达国家的关注。近年来，我国政府相继提出了应对气候变化的国家方案，实施了应对气候变化的科技专项行动。党的十九大报告明确指出我国应成为国际全球变化研究和全球应对气候变化的参与者、贡献者和引领者。发展高度集约化下农田系统的碳氮循环理论与温室气体排放控制策略，探索农业废弃物资源化的温室气体增汇减排途径将在国际陆地生态系统碳氮循环与全球变化科学中树立我国特色，并在探索符合国情的资源节约型、环境和气候友好型低碳农业发展道路具有重要意义。

2．研究方向和主要研究内容

简要介绍实验室的研究方向和主要研究内容，主要研究方向与实验室代表性研究成果的吻合程度等。（1000 字以内）

低碳农业是在农业废弃物资源高效利用基础上的低自然资源消耗和外源化学投入、以农业固碳和温室气体减排核心、以气候友好型农业可持续发展为目标，实现农业高产、养分高效利用和温室气体减排协同的一种农业可持续发展模式。紧紧围绕低碳农业的主要内涵和研究内容，通过长期的积累和积淀，本实验室形成特色鲜明、在国内外有较大影响的 4 个主要研究方向：（1）土壤碳氮循环与温室气体减排；（2）气候变化对农业的影响与应对；（3）农业废弃物资源化利用与低碳途径；（4）低碳农业的土壤微生物生态学机制。

方向一：土壤碳氮循环与温室气体减排

该方向主要基于中国典型农田生态系统温室气体通量的长期原位观测资料，研究土壤碳氮温室气体排放过程、特征及其规律，在剖析土壤碳、氮循环和温室气体排放过程与土壤-作物-人为活动关系基础上，运用生态系统模型理论和数据整合分析计量方法，以观测试验-数据整合分析-统计模型集成方法与 GIS 技术相结合，实现从试验田块点尺度-区域尺度-国家尺度的空间区域尺度拓展，以及试验观测的季节尺度-年尺度-年代尺度的延伸，系统评估我国典型农田温室气体排放现状、趋势及其减排潜力。相关研究成果为我国农业温室气体排放清单编制和寻求适合我国农业生产特点的自主减排对策提供了科学和技术支撑。

方向二：气候变化对农业的影响与应对

该方向依托气候变化对农田生态系统影响的长期定位试验基地为依托，以大气 CO_2 浓度升高、温度升高、干旱、氮沉降等全球变化因子为重点，试验观测研究气候变化对农业生态系统和生产过程的影响，探讨气候变化对农业生产和农田生态系统的直接和间接影响机理，农业适应和应对气候变化的潜力与瓶颈；研究农业减排与适应气候变化的协同耦合性机制与技术途径，探索适应性低碳农业的原理与技术；试验研发适应和应对的低碳农业模式，为我国农业适应和应对气候变化，保持农业生产和农业经济可持续发展提供决策和技术支撑。

方向三：农业废弃物资源化利用与低碳途径

该方向针对我国化学氮肥普遍过量施用、农业秸秆和畜禽粪便大量废弃、气候变化日趋剧烈的现状，研发利用农田秸秆和有机废料等农业废弃物的生物质碳化和资源化等循环利用模式，研制废弃物生物质碳化技术、肥料化技术、新型生

物有机肥固碳增汇与增产的田间配套技术、新型农田化学肥料的合理运筹配套技术，以达到提高氮肥及养分资源利用效率、增强农田土壤碳汇、减少农业废弃物温室气体排放的目的，从而实现减缓气候变化、减少环境污染、保障粮食安全的三赢效应。该方向在农业废弃物生物质炭化和生物有机肥料化等方面引领了行业发展，为可持续农业的低碳途径提供了技术工艺支撑。

方向四：低碳农业的土壤微生物生态学机制

该方向主要围绕低碳农业的废弃物资源化利用、温室气体减排及健康土壤培育等核心环节，重点研究废弃物资源生物质炭化和生物肥料化对土壤碳氮过程驱动的微生物学生态机制；土壤碳氮过程及温室气体排放的功能微生物学驱动机制；连作障碍土壤的修复与健康土壤培育的微生物群落特征及功能发挥，进一步探讨低碳农业的土壤生物多样性、生态系统结构与生态系统功能的关系，提出和发展低碳农业构建的土壤微生物生态学理论。

3．研发条件

简要介绍实验室研发用房面积和仪器设备原值情况，依托单位在人员、政策、经费和后勤保障等方面应给予大力支持，包括实验室运行经费、人才培养和引进经费、仪器设备等基础条件投入情况。（600 字以内）

实验室在学校的大力支持下，于 2011 年完成校内实验室改造、整合和完善，进一步装备和完善实验室仪器设备，建成拥有面积 2100 M^2、仪器设备精良、功能齐全、满足实验室各主干方向科研和人才培养需求的重点实验室，配备了同位素质谱仪、气相色谱仪、碳氮元素流动分析仪等大型仪器设备，实验室仪器设备总值。。。。万元，实验室安装了门禁系统，配备专人管理实验室安全。实验室在常熟占地 30 亩，建成了同步模拟自由大气 CO_2 浓度升高和温度升高的 T-FACE 野外观测平台，从事低碳农业与气候变化应对试验观测，具备国内一流、国际水平的示范基地；在学校和学院图书资料库的基础上，购置实验室必备的相关软件和图书资料。

实验室运行经费主要来源于省重点实验室建设专项资金、依托农业资源与环境国家重点学科和“双一流学科”建设专项资金、省优势学科建设专项资金、中央高校基本科研业务费、高层次引进人才专项等，以及实验室承担国家、省部级及地方委托横向科研项目经费、以及实验室对外服务收益等自筹经费。作为依托学科的重要研究平台，学校和学院在研究生招生、青年骨干教师招聘与引进等方面给予政策倾斜和扶持，通过特区政策单列指标和专项经费设立，优先保障实验室在人才培养和引进方面的大力支持。

三、队伍建设与人才培养

（一） 队伍建设总体情况

1． 实验室队伍

简述实验室队伍的总体情况，包括总人数，队伍专业配置、年龄层次、岗位设置、职称比例、人才成长和学术水平。中青年研究骨干比例及作用，吸引、培养优秀中青年人才的措施及取得的成绩等。(1000 字以内） 实验室现有人员 30 名，具有较强的专业和学科交叉背景，主要来源于土壤学、生态学、环境科学和植物营养学等学科专业领域。实验室设置研究人员、技术人员和管理人员等岗位，其中，研究人员 25 名，实验技术人员 3 名，实验室管理人员 2 名。实验室成员中具有高级职称人员 21 名，占 70%（其中具有正高级职称人员 14 名，占 47%，具有副高级职称人员 7 名，占 23%），具有中级职称人员 9 名，占 30%。 实验室十分重视人才培养，依托农业资源与环境国家重点学科和“双一流学科”建设专项资金、省优势学科建设专项资金、中央高校基本科研业务费、高层次引进人才专项等，通过培养与引进途径加强中青年人才队伍建设，取得明显成效。实验室方向带头人中，1 人获得国家杰青、国家万人计划科技创新领军人才和江苏省特聘教授，1 人入选“千人计划”特聘教授，1 人入选全国农业科研杰出人才和农业科技创新团队带头人，1 人曾任国务院学位委员会学科（农业资源与环境）评议组召集人。 实验室注重青年人才的培养和引进，近 3 年实验室从国外引进的优秀博士 5 名。实验室注重搭建平台，通过设立实验室人才专项经费，促进青年人才成长。实验室成员中 45 岁以下的青年骨干 18 人，占 60%。实验室 3 名中青年骨干入选教育部新世纪人才，1 人入选科技部科技领军人才、1 人入选中国科协青年托举人才和江苏省优青，2 人入选江苏省“青蓝工程”和 “333 工程”中青年学术骨干。

2．实验室主任和方向带头人

简要列举实验室主任及学术带头人学术简历。(每个方向带头人简历 400 字以内） **实验室主任及方向一带头人：邹建文**，南京农业大学土壤学和美国莱斯大学生态学双博士，南京农业大学资源与环境科学学院副院长，特聘教授(二级)、“环境科学与工程”学科负责人。兼任教育部科技委农林学部委员，中国土壤学会理事、青年工作委员会主任，江苏省土壤学会副理事长。兼任江苏省政协委员、提案工作委员会委员，农工党中央人口与资源工作委员会委员，农工党江苏省委委员、农业与农村工作委员会主任，江苏省欧美同学会理事。 长期从事土壤碳氮循环与全球变化研究研究，近年来在国家农田温室气体

排放清单、土壤温室气体对全球变化的响应以及减排对策等方面取得了重要成果。已在 Ecology Letters、Global Change Biology、Environmental Science & Technology 等期刊发表 SCI 收录论文 60 余篇，被国内外引用 3000 余次，多篇论文入选 ESI 高被引论文。以主要完成人获部省级科技进步一等奖 2 项，获得全国优秀博士学位论文和国家杰出青年科学基金资助，入选国家“万人计划”科技领军人才、科技部中青年科技创新领军人才、全国农业产业体系岗位科学家、江苏省特聘教授、江苏省 333 第二层次培养对象等人才计划。现任国际学术刊物 Scientific Reports 和 Heliyon 编委。

方向二带头人：胡水金，资源与环境科学学院教授。2014 年入选国家“千人计划”（第十期），任南京农大特聘教授。主要从事陆地表层碳氮过程与气候变化研究，在土壤碳氮过程对气候变化的响应机制、气候变化驱动的土壤微生物响应等方面取得了国际影响的创新成果，以第一作者或通讯作者在世界顶尖自然科学杂志（Nature、Science）与生态学杂志(Trends in Ecology & Evolution、Ecology Letters、Global Change Biology)上发表论文十多篇。培养的研究生与博士后中多人成为“青年千人”，“优青”，或科技部重点专项首席专家。获得美国植病学会杰出青年科学家奖（2002），中国国家自然科学基金委员会杰出青年科学基金(2002)。曾任美国生态学会亚洲分会主席(2013-2015)，现任《PLoS One》和《Journal of Plant Ecology》编委。

方向三带头人：潘根兴，资源与环境科学学院教授。南京农业大学二级教授，土壤学国家重点学科带头人。曾任国务院学位委员会第六届学科评议组“农业资源与环境”学科召集人，中国科协联合国环境事物咨商工作委员会委员，IPCC 第五次评估报告温室气体清单工作组湿地补充文本-有机土壤组共同召集人；联合国环境署 Mitigation Gap (2013)通讯作者等。Journal of Integrative Agriculture，GCB Bioenergy 等刊物编委，《中国农业科学》栏目主审，《地球与环境》副主编。主要从事农业生物质利用与低碳农业途径研究，在 Global Change Biology 等刊物上发表 SCI 论文 70 余篇，近 10 篇论文入选 ESI 高被引论文，3 篇论文入选 2012-2016 年中国农学领域十大热点论文。研究成果为我国农业低碳安全和可持续发展提供了战略依据和技术发展建议。

方向四带头人：徐阳春，资源与环境科学学院教授。全国农业科研杰出人才和农业废弃物资源化创新团队带头人，江苏省“青蓝工程”科技创新团队带头人，国家重点研发专项“农业废弃物资源化利用机制”首席科学家，主要从事农业废弃物资源化及其微生物生态学机制研究，在 ISME J、SBB 等国际主流刊物上发表 SCI 论文 40 余篇，作为主要完成人获得国家科技进步二等奖和技术发明二等奖 2 项，省部级一等奖 3 项。研究成果为我国农业废弃物资源化和低碳农业健康土壤培育提供了技术支撑和微生物生态学理论支持。

附表 1：固定人员名单（按照研究方向填写）

序号	研究方向	姓名	性别	学位	职称	年龄	所学专业	现从事专业	在实验室工作期限	类型
1	一：土壤碳氮循环与温室气体减排	邹建文	男	博士	教授	47	生态学	环境科学	2010-至今	研究人员
2		熊正琴	女	博士	教授	44	土壤学	土壤学	2010-至今	研究人员
3		潘剑君	男	博士	教授	59	土壤学	土壤学	2010-至今	研究人员
4		蒋静艳	女	博士	副教授	46	环境科学	环境科学	2010-至今	研究人员
5		李兆富	男	博士	副教授	43	环境科学	环境科学	2010-至今	研究人员
6		周权锁	男	硕士	高级实验师	51	环境科学	环境科学	2010-至今	技术人员
7		张慧娟	女	博士	讲师	36	土壤学	土壤学	2013-至今	管理人员
8	二：气候变化对农业的影响与应对	胡水金	男	博士	教授	53	生态学	生态学	2014-至今	研究人员
9		胡　锋	男	博士	教授	55	生态学	生态学	2010-至今	研究人员
10		李辉信	男	博士	教授	54	土壤学	土壤学	2010-至今	研究人员
11		刘满强	男	博士	教授	38	生态学	生态学	2010-至今	研究人员
12		刘树伟	男	博士	副教授	42	生态学	生态学	2012-至今	研究人员
13		卞荣军	男	博士	讲师	30	土壤学	土壤学	2013-至今	研究人员
14		赵海燕	女	硕士	讲师	35	土壤学	土壤学	2012-至今	管理人员
15	三：农业废弃物资源化利用与低碳途径	潘根兴	男	博士	教授	60	土壤学	土壤学	2010-至今	研究人员
16		郭世伟	男	博士	教授	49	植物营养学	植物营养学	2010-至今	研究人员
17		李恋卿	女	博士	教授	52	土壤学	土壤学	2010-至今	研究人员
18		郑聚锋	男	博士	副教授	40	土壤学	土壤学	2010-至今	研究人员
19		程　琨	男	博士	讲师	36	土壤学	土壤学	2013-至今	研究人员
20		刘志鹏	男	博士	讲师	32	土壤学	土壤学	2014-至今	研究人员
21		刘晓雨	男	博士	讲师	34	土壤学	土壤学	2014-至今	技术人员
22	四：低碳农业的土壤微生物生态学机制	徐阳春	男	博士	教授	53	植物营养学	植物营养学	2010-至今	研究人员
23		张瑞福	男	博士	教授	43	微生物学	微生物学	2010-至今	研究人员
24		沈　标	男	博士	教授	56	微生物学	微生物学	2010-至今	研究人员
25		韦　中	男	博士	副教授	36	植物营养学	植物营养学	2012-至今	研究人员
26		刘东阳	男	博士	副教授	35	植物营养学	植物营养学	2012-至今	研究人员
27		张　楠	男	博士	副教授	34	植物营养学	植物营养学	2013-至今	研究人员
28		李舒清	女	博士	讲师	35	植物营养学	植物营养学	2014-至今	研究人员
29		徐志辉	男	博士	讲师	31	植物营养学	植物营养学	2015-至今	研究人员
30		邵佳慧	女	博士	实验室	34	植物营养学	植物营养学	2013-至今	技术人员

注：(1) 固定人员包括研究人员、技术人员、管理人员三种类型，应为所在高等学校聘用的聘期 2 年以上的全职人员。(2) “在实验室工作期限”栏中填写每人实际在实验室工作的起止时间。

附表 2：流动和兼职人员名单

序号	姓名	类型	性别	年龄	职称	国别	工作单位	在实验室工作时长
1	EVAN SIEMANN	访问学者	男	51	教授	美国	莱斯大学（RICE UNIVERSITY）	15
2	陈书涛	访问学者	男	38	副教授	中国	南京信息工程大学	24
3	张　令	访问学者	男	35	副教授	中国	江西农业大学	16
4	张要军	访问学者	男	30	讲师	中国	河南大学	10
5	沈宗专	博士后	男	32	讲师	中国	南京农业大学	16
6	缪有志	博士后	男	30	讲师	中国	南京农业大学	8
7	张　健	博士后	男	31	讲师	中国	南京农业大学	14

注：（1）包括“博士后研究人员、访问学者、其他”三种类型，请按照以上三种类型进行人员排序。（2）在“实验室工作时长”填写每人实际在实验室工作时长，以“月”为单位。

（二）人才培养

简述实验室人才培养的代表性举措和效果，包括跨学科、跨院系的人才交流和培养，与国内、国际科研机构或企业联合培养创新人才等，特别是45周岁以下骨干人才和研究生的培养等。(800 字以内)

（一）以科研项目为纽带，搭建跨学科和院系学术交流平台

实验室以南京农业大学农业资源与环境国家“双一流”建设学科、生态学江苏省重点学科和科研项目为纽带，搭建低碳农业与温室气体排放研究青年学术论坛等学术交流平台，充分整合我校现有人才资源，以实验室现有团队为基础，吸收跨院系从事低碳农业与全球变化研究的相关科研人员参加，通过实验室开放课题设置，吸引校外优秀青年人才来实验室访学和学术交流，优化学缘结构和年龄结构，壮大现有队伍，提高实验室学术研究水平，培养实验室青年骨干人才。

（二）加强国际学术交流，引进和培养具有国际视野的优秀骨干人才。

实验室依托国家外专局和教育部的农业资源与环境的生物学海外创新引智基地（111 项目），加强国际学术交流，引进学风正派、凝聚力强、思维敏捷、乐于奉献的海外学术带头人和具有发展潜力的海外青年骨干，近 3 年先后引进了胡水金教授千人计划特聘专家、杨天杰博士（荷兰乌特勒支大学博士）、郭辉博士（美国佛罗里达州立大学博士后）等，同时积极利用 111 创新引智平台和国家留学基金委公派留学项目，选派优秀骨干教师和博士生赴国外一流大学访学，提升了实验室人才培养的国际化水平。

（三）依托一流学科优势，提升实验室研究生培养质量

实验室依托农业资源与环境国家“双一流”建设学科和省优势学科、生态

学省重点学科和环境科学与工程校一级重点学科招生研究生，每年招收博士生 10 名左右，硕士生 30 名左右。依托农业资源利用和生态学博士后流动站每年招收博士后 2-3 名，接受访问学者和海外留学生 1-2 名，形成了实验室较为完善的“本科-硕士-博士-留学生-博士后”创新人才培养体系，2 篇博士学位论文获江苏省优秀博士学位论文奖。

附表 3：毕业博士生名单

序号	博士生姓名	毕业年度	就业领域	单位名称	导师姓名
1.	王　从	2017	科研机构（国内）	江苏省农业科学院	邹建文
2.	李　博	2017	科研机构（国内）	华南农业大学	熊正琴
3.	张登晓	2017	科研机构（国内）	河南农业大学	潘根兴
4.	魏家星	2017	科研机构（国内）	南京农业大学	胡　锋
5.	周慧民	2017	科研机构（国内）	江苏省农业科学院	潘根兴
6.	张晓旭	2017	科研机构（国内）	河北科技大学	熊正琴
7.	孙玉明	2017	科研机构（国内）	江苏省中科院植物所	郭世伟
8.	张要军	2016	科研机构（国内）	河南大学	邹建文
9.	马　超	2016	科研机构（国内）	安徽农业大学	李辉信
10.	李　欢	2016	科研机构（国内）	华南农业大学	徐阳春
11.	胡香玉	2016	科研机构（国内）	广东省农业科学院	郭世伟
12.	虞　丽	2016	企业	江苏点米网络科技股份有限公司	李辉信
13.	陈　德	2016	科研机构（国内）	浙江省农业科学院	李恋卿
14.	陈照志	2016	科研机构（国内）	青岛农业大学	熊正琴
15.	高丽敏	2016	科研机构（国内）	南京农业大学	郭世伟
16.	田广丽	2016	科研机构（国内）	中国农科院灌溉所	郭世伟
17.	王　泓	2016	科研机构（国内）	安徽科技学院	邹建文
18.	胡志强	2015	科研机构（国内）	江苏省泰州学院	邹建文
19.	杨　波	2015	科研机构（国内）	农业部环境保护科研检测所	熊正琴
20.	丁　雷	2015	博士后（国外）	比利时法语鲁汶大学	郭世伟
21.	吴　迪	2015	科研机构（国内）	江苏省农业科学院	胡　锋
22.	闫　明	2015	科研机构（国内）	附件农林大学	潘根兴
23.	高翠民	2015	科研机构（国内）	河南省农科院	郭世伟
24.	张　曼	2015	科研机构（国内）	西北农林科技大学	熊正琴
25.	任彬彬	2015	科研机构（国内）	沈阳农业大学	郭世伟
26.	缪汉鹏	2015	科研机构（国内）	福建农林大学	徐阳春
27.	郭九信	2015	科研机构（国内）	福建农林大学	郭世伟

注：请根据就业领域依次按科研机构（大学、研究机构）(国外)、科研机构（国内）、政府机关、企业、博士后（国外）、博士后（国内）、其他为序分别填报。**所有研究生的导师必须是实验室固定研究人员。**

附表 4：联合培养研究生名单

序号	学号	姓名	专业	所在学院/系	导师姓名	联合培养单位名称
1	2016203002	陈　杰	生态学	资环学院	邹建文	美国明尼苏达大学（国家公派留学）
2	2015203017	靳亚果	土壤学	资环学院	邹建文	美国加州大学戴维斯分校（国家公派留学）
3	2016203004	蒋林惠	生态学	资环学院	胡　锋	德国科隆大学（国家公派留学）
4	2015203007	郭　瑞	生态学	资环学院	李辉信	美国加州大学河滨分校（国家公派留学）
5	2015203024	孙传亮	植物营养学	资环学院	徐阳春	荷兰乌特勒支大学（国家公派留学）
6	2015203043	孙富生	土壤学	资环学院	潘根兴	荷兰瓦赫宁根大学（国家公派留学）

注：联合培养单位包括本校其他院系、其他国内外科研机构和高校、企业等，需双方单位签订有联合培养协议。

三、研究水平与贡献

1．承担科研任务

概述实验室考核验收期内承担科研任务总体情况。（800 字以内）

实验室考核验收期内承担国家和省部级、横向项目 40 多项，总经费 8566 万元。其中，国家级项目 30 多项，科研经费总计 8321 万元，包括：主持“十三五”国家重点研发专项“农业废弃物资源化利用机制（2017YFD0800200）”1 项，经费 2300 万元。主持国家公益性行业（农业）专项“旱地两熟区耕地培肥与合理农作制（201503121）”1 项，经费 2163 万元。主持 973 计划课题“水旱轮作土壤微生物区系交替演变特征与稻田氮素高效利用研究（2015CB150502）”和“畜禽有机肥氮磷生物转化与促效机制（2013CB127403）”2 项，经费 1122 万元。主持承担国家 863 计划项目“新型农业微生物肥效制剂的创制（2013AA102802）”和科技支撑计划课题“气候变化对农业生产影响与风险评估技术（2012BAC19B01）”2 项，经费 1205 万元。主持中央高校业务费重大专项“酸性土壤资源高效利用的生物学机制（KYTZ201404）”1 项，经费 400 万元。主持国家基金委杰出青年科学基金项目“土壤碳氮循环与全球变化（41225003）”1 项，经费 280 万元；国家基金面上项目 16 项，经费 1141 万元；国家基金青年项目 10 多项，经费 200 多万元。此外，实验室还承担了一些省部级科研项目和地方企业委托项目，经费 200 多万元。

附表 5：承担重大科研项目情况表（不超过 30 项）

序号	项目/课题名称	编号	负责人	起止时间	经费(万元)	类别
1	农业废弃物资源化利用机制	2017YFD0800200	徐阳春	2017-2021	2300	国家重点研发计划项目
2	旱地两熟区耕地培肥与合理农作制	201503121	胡　锋	2015-2019	2163	国家公益性行业（农业）科研专项
3	酸性土壤资源高效利用的生物学机制研究	KYTZ201404	邹建文	2014-2017	400	中央高校基本科研业务费重大专项
4	水旱轮作土壤微生物区系交替演变特征与稻田氮素高效利用研究	2015CB150502	邹建文	2015-2019	524	“973”计划课题
5	畜禽有机肥氮磷生物转化与促效机制	2013CB127403	郭世伟	2013-2017	598	“973”计划课题
6	新型农业微生物肥效制剂的创制	2013AA102802	张瑞福	2013-2017	827	“863”计划
7	气候变化对农业生产影响与风险评估技术	2012BAC19B01	潘根兴	2012-2016	378	科技支撑计划课题
8	土壤碳氮循环与全球变化	41225003	邹建文	2013-2016	280	国家自然科学基金（杰青）
9	低发土传枯萎病蕉园根际微生物区系特征解析及其调控机制	31572212	李　荣	2016-2019	79	国家自然科学基金（面上）
10	太湖地区湖库水源地流域湿地景观格局多样性的水环境过程与功能响应机制	41571171	李兆富	2016-2019	70	国家自然科学基金（面上）
11	堆肥菌株 A.fumigatus Z5 多糖单加氧酶功能及其木质纤维素分解增效机制研究	31572200	刘东阳	2016-2019	65	国家自然科学基金（面上）
12	生物炭对菜地土壤 N_2O 产生过程的影响机理研究	41471192	熊正琴	2015-2018	90	国家自然科学基金（面上）
13	重金属污染对水稻土有机碳稳定性的影响机制研究	41471193	张旭辉	2015-2018	82	国家自然科学基金（面上）
14	土壤线虫提高细菌合成吲哚乙酸能力的分子机制	41571244	李辉信	2015-2018	63	国家自然科学基金（面上）
15	生境调控红壤食物网结构和功能的时序变化及影响机制	41371262	刘满强	2014-2017	80	国家自然科学基金（面上）
16	秸秆生物质炭对农田土壤有机碳保持作用及其机制	41371298	潘根兴	2014-2017	80	国家自然科学基金（面上）

17	农业生物质炭输入对农田土壤有机碳固定的影响及其微生物学机制研究	41371300	郑聚锋	2014-2017	70	国家自然科学基金（面上）
18	水通道蛋白（AQP）影响水稻叶片光合氮素利用效率的机制研究	31272236	郭世伟	2013-2016	76	国家自然科学基金（面上）
19	土壤食细菌线虫取食细菌的偏好性及其分子机制	41271270	李辉信	2013-2016	75	国家自然科学基金（面上）
20	蚯蚓长期影响下农田土壤生态功能演变及作用机制研究	41171206	胡　锋	2012-2015	80	国家自然科学基金（面上）
21	不同农业生产方式下菜地氧化亚氮排放的观测比较研究	41171194	邹建文	2012-2015	75	国家自然科学基金（面上）
22	农业生物质循环利用减缓稻田综合净温室效应潜力观测与评估	41171238	熊正琴	2012-2015	65	国家自然科学基金（面上）
23	太湖地区典型湖库型饮用水源地流域氮磷输移过程模拟与调控研究	41171071	李兆富	2012-2015	65	国家自然科学基金（面上）
24	抗生素 Bacillomycin D 调控芽孢杆菌根表生物膜形成的分子机理	31501833	徐志辉	2016-2018	26	国家自然科学基金（青年）
25	生物质炭施用对水稻根系形态及根际土壤性质的影响研究	41501310	刘晓雨	2016-2018	26	国家自然科学基金（青年）
26	用于作物生产可持续性评估的碳、氮、水足迹集成分析	41501569	程　琨	2016-2018	26	国家自然科学基金（青年）
27	添加生物质炭对污染稻田土壤 Cd 有效性及水稻吸收影响的后效应研究	41501353	卞荣军	2016-2018	20	国家自然科学基金（青年）
28	生物质炭添加对旱地红壤热性质的影响机理研究	41401241	刘志鹏	2015-2017	26	国家自然科学基金（青年）
29	畜禽粪便堆肥中 CH_4 和 N_2O 排放及其微生物学机制研究	41401321	李舒清	2015-2017	26	国家自然科学基金（青年）
30	番茄根际劳尔氏属菌(Ralstonia spp.)种间竞争机制研究	41301262	韦　中	2014-2016	23	国家自然科学基金（青年）

注：请依次以国家重大科技专项、“973”计划、“863”计划、国家自然科学基金（面上、重点和重大、创新研究群体计划、杰出青年基金、重大科研计划）、国家科技（攻关）、国防重大、国际合作、省部重大科技计划、重大横向合作等为序填写，并在类别栏中注明。若该项目或课题为某项目的子课题或子任务，请在类别中说明。课题负责人不是实验室固定（正式聘任）人员的不得填报。

2．研究成果与水平

（一）结合研究方向，简要概述取得的重要研究成果与进展，以及成果在国际和国内所处的水平；（800 字以内）

研究方向一：土壤碳氮循环与温室气体减排

本方向基于全球土壤 NO 和 NO+N_2O 排放数据库，采用数据集成和整合分析，定量评估了全球土壤 NO 和 NO+N_2O 排放强度，明确了高氮肥菜地和热带亚热带酸性土壤是全球 NO+N_2O 排放的高值区，辨析了不同地区和不同种类氮肥施用引起的土壤氮氧化物排放差异，提出了减少土壤 NO+N_2O 排放的肥料施用对策。研究成果发表在环境科学类权威期刊 Global Change Biology (2017，$IF_{5\text{-}yr}$=9.455)上，填补了从上至下和从下至上两种研究方法估算结果的缺口，提高了全球土壤氮氧化物排放清单的针对性和精确性。

研究方向二：气候变化对农业的影响与应对

阐明了水稻生产对气候变化的响应规律。发现大气 CO_2 浓度升高增加稻麦产量主要归因于穗数增加，而对千粒重和收获指数无显著效应。提出了氮素、温度升高及臭氧浓度等胁迫因子限制大气 CO_2 浓度升高对作物生长施肥效应的机制。依托同步模拟自由大气 CO_2 浓度升高和温度升高的稻麦轮作生态系统观测试验平台（T-FACE），揭示了大气 CO_2 浓度升高和温度升高条件下稻田温室气体 CH_4 和 N_2O 排放的季节变化特征，阐明了稻田对大气 CO_2 浓度和温度升高的微生物学反馈机制。论文发表在 Climatic Change（2015）、Frontiers in Microbiology（2017）和 Agriculture, Ecosystems & Environment（2017）上。

研究方向三：农业废弃物资源化利用与低碳途径

评估了农业废弃物生物质炭化途径及其生物质炭施用对土壤呼吸及其土壤有机碳组分影响。采用 Meta 分析的方法研究了生物质炭的施用对土壤呼吸、土壤有机碳及微生物量碳的影响。研究结果表明，生物质炭的施用对土壤 CO_2 排放通量无显著影响，但土壤有机碳和微生物生物量碳含量分别提高了 40%和18%。粪便和作物秸秆制成的生物质炭对土壤有机碳积累效应最明显。因此，要评估生物质炭的减缓气候变化潜力，应当考虑土壤的理化性质、土地利用类型、农业操作规范以及生物质炭的特性。两篇论文发表在 GCB Bioenergy（2016）上，被 SCI 引用 65 次和 26 次，都入选 ESI 高被引论文，被 Renewable Energy global innovations 网站报道：https://reginnovations.org/bioenergy/。

研究方向四：低碳农业的土壤微生物生态学机制

探明了调控土壤微生物区系的功能微生物功能发挥的营养因子，获得了功能菌活性物质合成及定殖相关基因在 RNA 转录水平上表达差异。开发出了基于生物有机肥的高产土壤微生物区系的低碳农业土壤调控途径，提出了长期利用有机类肥料构建高产粮田土壤微生物区系技术。建立了基于根际微生物营养和拮抗竞争特征的益生菌群构建原则。发现功能菌群的资源利用幅度和产拮抗物质特征能很好地解释其高效的根际定殖能力。此外，最佳功能菌群在资源利用上的互补效应和在拮抗物质抑菌中的协同效应，对病害防控起关键作用。受邀在国际著名综述期刊 Current Opinion in Microbiology（2017）撰写“根系-土壤-

微生物在根际的互作与作物生产”主题文章。

（二）简要概述代表性研究成果，包括获奖、杰出人才、论文和专著、标准和规范、发明专利、仪器研发方法创新、政策咨询、基础性工作等（不超过5项）。(2000字以内）

代表性成果一：科研获奖-有机肥作用机制和产业化关键技术研究与推广获2015年度国家科技进步二等奖（2015-J-25101-2-08-D01）团队获农业部创新团队奖（等同于科研成果一等奖，TD2015-D024-01）。

实验室研究方向三围绕农业废弃物资源化循环利用，开展了农业废弃物有机肥料化利用机制和产业化关键技术研发和推广工作，相关成果获2015年度国家科技进步二等奖和农业部创新团队奖。主要成果包括：

系统研发商品有机肥制造新技术新工艺，促进了我国有机肥产业的提档升级。针对我国每年产生的大量畜禽粪便和作物秸秆处置利用不当、造成严重的资源浪费和环境污染问题，依托校企共建国家有机（类）肥料工程技术中心和协同创新中心，研发出堆肥效率高、固定资产投入小的条垛式堆肥发酵新工艺及配套的堆肥制剂和翻抛设备，被全国350多家有机肥企业采用，占规模化有机肥企业总数的40%；研发出商品有机无机复混肥先混后粉、低温烘干造粒工艺，克服了传统造粒工艺粉尘多、高温烘干杀死微生物等缺点，上述产品应用于大田使化肥氮利用率显著提高；主持修订全国商品有机肥行业标准，累计推广有机肥和有机无机复混肥1.8亿亩。

首次建立了生物有机肥二次固体发酵工艺，突破了土壤连作障碍的技术瓶颈。针对我国土壤微生物区系破坏而导致土壤连作障碍日益加剧的实际，筛选到能够显著促进作物根系生长和拮抗土传病害的解淀粉芽孢杆菌和哈茨木霉，获得了这些功能菌高密度液体和固体发酵的工艺参数；首次建立了生物有机肥二次固体发酵的技术工艺，研制出生物有机肥系列产品20多个，与市场各种生物肥相比，促生生物肥增产15%以上；拮抗土传病的生物肥与土壤绿色处理结合使用，土传病害防效达到85%以上。上述技术及新产品转让到6家生物有机肥龙头企业，推广面积超过8000万亩，获得了显著的经济、社会和环境效益。

因有机肥研发和推广等突出业绩，部分成果获2015年国家科技进步奖二等奖，团队获2015年农业部创新团队奖。

代表性成果二：杰出人才-实验室方向带头人和青年骨干入选多项国家（万人、千人计划）和省部级人才计划。

实验室主任及方向一带头人邹建文教授继2012年获得国家杰青后，先后入选科技部科技创新领军人才（2014）、第二批国家“万人计划”科技领军人才（2016）和江苏省“333工程”第二层次培养人选（2016）等人才计划；实验室方向二带头人胡水金教授入选国家“千人计划”特聘教授（2015）；实验室方向四带头人徐阳春教授入选国家农业科研杰出人才（2015）。实验室青年骨干张瑞福教授入选科技部科技创新领军人才（2016）、第三批国家“万人计划”科技领军人才（2017）；韦中博士、刘树伟博士分别入选中国科协青年托举人才、省优青、省“青蓝工程”和省“333工程”优秀学术带头人等省部级人才计划。

代表性成果三：论文-全球土壤 NO 和 $NO+N_2O$ 排放的数据集成研究，论文发表在环境科学领域国际权威期刊 Global Change Biology（2017，IF_{5-yr}=9.454）上。

氮肥施用是全球大气 NO 和 N_2O 的重要排放源，国际上基于陆地生态系统通量观测的集成（从下至上方法学）结果与基于大气浓度变化的反演（从上至下方法学）结果存在较大差异，如何填补两种研究结果的差异成为土壤氮循环和氮氧化物排放研究领域的科学难点。实验室建立了全球土壤 NO 和 $NO+N_2O$ 排放数据库，定量评估了全球土壤 NO 和 $NO+N_2O$ 排放强度及其驱动机制，明确了高氮肥菜地和热带亚热带酸性土壤是全球 $NO+N_2O$ 排放的高值区。通过收集 114 篇期刊上已发表的数据，共包含 520 组田间原位观测数据，利用整合分析，研究了全球土壤氮氧化物排放强度及其主要影响因素。分析结果表明，菜地农田的土壤 NO 排放通量最高，而稻田最低，就不同气候带而言，热带亚热带酸性土壤 NO 和 N_2O 排放强度最高。与施用有机肥和有机无机混施相比较，施用化肥所引起的土壤 NO 排放最多。而与单独施用化肥相比较，化肥与硝化抑制剂的结合施用能够有效减少土壤 NO 的排放。在此基础上，提出了减缓土壤氮氧化物排放的措施，包括：有机部分替代化肥、降低化学氮肥施用量、减少田间灌溉量及频率等。为降低全球土壤 NO 排放估算不确定性以及合理减排，需要更多的土壤 NO 排放的多年原位连续观测资料。相关研究成果发表在环境领域国际权威期刊 Global Change Biology 上，被科技日报等 10 多家媒体相继报道。

代表性成果四：论文-农业废弃物生物质炭利用及其对土壤有机碳库的影响研究，两篇论文发表在农学综合类权威期刊 Global Change Biology Bioenergy（2016，IF_{5-yr}=5.473）上，分别被 SCI 引用 65 次和 26 次，两篇论文都入选 ESI 高被引论文。

评估了生物质炭施用对土壤呼吸、激发效应及其土壤有机碳组分影响。采用数据集成和整合分析的方法研究了生物质炭的施用对土壤呼吸、激发效应、土壤有机碳及微生物量碳的影响。研究结果表明，生物质炭的施用对土壤 CO_2 排放通量无显著影响，但能显著提高土壤有机碳和微生物生物量碳含量的 40% 和 18%。对于土壤 CO_2 排放通量的积极响应只体现在田间试验、培养实验以及未被翻耕和种植的土壤中；而在有植株参与以及施加氮肥的土壤中施加生物质炭时能明显地增加土壤微生物量碳的含量；另外，对于不同土地利用类型的稻田而言，土壤有机碳含量的增加最为明显。复合氮肥和堆肥的共同施用条件下，土壤 CO_2 排放通量和土壤微生物量碳含量会急剧增加。土壤 CO_2 的排放通量和土壤微生物量碳含量是随着生物质炭的施用量、热裂解温度以及 C/N 比的增加而递减的；反之，土壤有机碳含量随之递增。对于不同生物质炭的原料来源，粪便和作物秸秆对其影响最大。土壤 CO_2 排放通量随着生物质炭的 pH 值的增加而递减，当 pH 值在 8.1~9.0 范围之内时，土壤有机碳和土壤微生物量碳含量最高。因此，要评估生物质炭的减缓气候变化潜力，应当考虑土壤的理化性质、土地利用类型、农业操作规范以及生物质炭的特性。论文发表在 GCB Bioenergy 上，被 Renewable Energy global innovations 网站作为亮点研究工作报道：

https://reginnovations.org/bioenergy/response-soil-carbon-dioxide-fluxes-soil-organic-carbon-microbial-biomass-carbon-biochar-amendment/。

代表性成果五：论文-农业淡水养殖湿地温室气体排放观测研究，论文发表在环境科学领域重要期刊 Environmental Science & Technology（2016，$IF_{5\text{-}yr}$=6.96）上，研究成果在国际上首次报道了淡水养殖湿地温室气体排放强度的原位观测结果。

淡水养殖湿地是大气温室气体 CH_4 和 N_2O 的重要排放源（IPCC, 2013）。国际上已有针对淡水养殖湿地 CH_4 和 N_2O 排放的估算主要基于淡水养殖系统水产品能量代谢系数的理论推算，缺乏试验原位观测数据支撑（IPCC，2013）。本课题组基于静态暗箱-气相色谱法原理，在农田温室气体通量原位观测方法基础上，建立了淡水养殖湿地 CH_4 和 N_2O 排放通量的原位观测系统。通过连续 2 年的通量原位观测发现，全年淡水养殖周期，CH_4 排放主要集中在淹水期和干塘初期，干塘后期直至下一年淹水养殖开始基本没有 CH_4 排放，有水草覆盖处理明显增加了 CH_4 排放，且排放量随淹水深度的增加而增加。与 CH_4 排放相反，N_2O 排放主要出现在干塘前期，干塘后期和淹水养殖阶段 N_2O 排放较低，干塘期的 N_2O 排放占全年总排放量达 80%左右。此外，与 IPCC（2013）基于代谢系数的理论推算结果比较发现，本研究分别依据养殖系统总氮投入量和单位水产养殖产量的 N_2O 排放系数估算结果与 IPCC 的理论推算结果存在高度一致性。相关研究成果发表在 Environmental Science & Technology (2016)上，首次报道了淡水养殖湿地 CH_4 和 N_2O 排放强度及主要驱动因子，填补了国际相关观测研究的空白，并为证明 IPCC 基于代谢理论推算的淡水养殖湿地 CH_4 和 N_2O 排放系数的科学合理性提供了数据支撑。

附表 6：省部级及以上科技奖励情况表

序号	获奖年度	授予部门	编号	成果名称	奖励类别	奖励等级	实验室获奖人员及排序	备注
1	2015	国务院	2015-J-25101-2-08-D01	有机肥作用机制和产业化关键技术研究与推广	国家科技进步奖	二等	徐阳春/第 2	
2	2015	农业部	TD2015-D024-01	有机肥与土壤微生物创新团队	优秀创新团队奖	等同于科研成果一等奖	徐阳春、邹建文、李荣/第 2、4、7	
3								
4								
…								

附表 7：代表性论文情况表（不超过 30 篇）

序号	论文题目	固定人员及排序	期刊名称	年，卷（期）：起止页	期刊影响因子	论文他引频次	备注
1	A meta-analysis of fertilizer-induced soil NO and combined NO+N_2O emissions.	刘树伟/第一作者 邹建文/通讯作者	Global Change Biology	2017, 23: 2520-2532.	9.455	3	
2	Plant breeding goes microbial	韦中/第一作者	Trends in Plant Science	2017, 22: 555-558	13.442	3	
3	Methane and nitrous oxide emissions reduced following conversion of rice paddies to inland crab-fish aquaculture in southeast China.	刘树伟/第一作者 邹建文/通讯作者	Environmental Science & Technology	2016, 50: 633-642.	6.960	2	
4	Biochar stability in soil: meta-analysis of decomposition and priming effects	熊正琴/第二作者	Global Change Biology Bioenergy	2016, 8: 512-523	5.473	63	ESI 高被引论文和热点论文
5	Response of soil carbon dioxide fluxes, soil organic carbon and microbial biomass carbon to biochar amendment: a meta-analysis.	刘树伟/第一作者 邹建文/通讯作者	Global Change Biology Bioenergy	2016, 8: 392-406	5.473	24	ESI 高被引论文
6	Effects of organic-inorganic compound fertilizer with reduced chemical fertilizer application on crop yields, soil biological activity and bacterial community structure in a rice-wheat cropping system	张瑞福/第七作者 李荣/第八作者 沈标/通讯作者	Applied Soil Ecology	2016, 99: 1-12	3.224	23	ESI 高被引论文
7	Consistent increase in abundance and diversity but variable change in community composition of bacteria in topsoil of rice paddy under short term biochar treatment across three sites from South China	刘晓雨/第二作者 李恋卿/第三作者 潘根兴/通讯作者	Applied Soil Ecology	2015, 91: 68-79	3.224	24	
8	Carbon footprint of grain crop production in China - based on farm survey data	程琨/第二作者 潘根兴/通讯作者	Journal of Cleaner Production	2015, 104: 130-138	6.207	23	
9	Combined effects of nitrogen fertilization and biochar on the net global	熊正琴/通讯作者	Atmospheric Environment	2015, 100: 10-19	3.948	22	

	warming potential, greenhouse gas intensity and net ecosystem economic budget in intensive vegetable agriculture in southeastern China						
10	Low uptake affinity cultivars with biochar to tackle Cd-tainted rice - A field study over four rice seasons in Hunan, China	李恋卿/通讯作者	Science of the Total Environment	2016, 541: 1489-1498	5.102	21	
11	Mitigating gaseous nitrogen emissions intensity from a Chinese rice cropping system through an improved management practice aimed to close the yield gap	熊正琴/通讯作者	Agriculture, Ecosystems & Environment	2015, 203: 36-45	4.678	20	
12	Biochar decreased microbial metabolic quotient and shifted community composition four years after a single incorporation in a slightly acid rice paddy from southwest China	郑聚锋/第一作者 潘根兴/通讯作者	Science of the Total Environment	2016, 571: 206-217	5.102	20	
13	Rhizosphere microbial community manipulated by 2 years of consecutive biofertilizer application associated with banana Fusarium wilt disease suppression	李荣/通讯作者	Biology and Fertility of Soils	2015, 51: 553-562	3.773	22	
14	Biochar helps enhance maize productivity and reduce greenhouse gas emissions under balanced fertilization in a rainfed low fertility inceptisol	潘根兴/第二作者 刘晓雨/通讯作者	Chemosphere	2016, 142: 106-113	4.506	18	
15	A 2-yr field assessment of the effects of chemical and biological nitrification inhibitors on nitrous oxide emissions and nitrogen use efficiency in an intensively managed vegetable cropping system	熊正琴/通讯作者	Agriculture, Ecosystems & Environment	2015, 201: 43-50	4.678	16	
16	Interaction matters: Synergy between vermicompost and PGPR agents improves soil quality, crop quality and crop yield in the field	刘满强/通讯作者	Applied Soil Ecology	2015, 89: 25-34	3.224	15	
17	Response of nitric and nitrous oxide fluxes to N fertilizer application in	邹建文/通讯作者	Scientific Reports	2016, 6: 20700	4.847	13	

	greenhouse vegetable cropping systems in southeast China						
18	Net global warming potential and greenhouse gas intensity from the double rice system with integrated soil-crop system management: A three-year field study	熊正琴/通讯作者	Atmospheric Environment	2015, 116: 92-101	3.948	11	
19	Linking N_2O emission from biochar-amended composting process to the abundance of denitrify (nirK and nosZ) bacteria community	李舒清/第一作者 邹建文/通讯作者	AMB Express	2016, 6: 37	2.332	10	
20	Different effects of invader-native phylogenetic relatedness on invasion success and impact: a meta-analysis of Darwin's naturalization hypothesis	刘满强/通讯作者	Proceedings of the Royal Society B-Biological Sciences	2016, 183: 20160663	5.417	7	
21	Resource utilization capability of bacteria predicts their invasion potential in soil	刘满强/通讯作者	Soil Biology & Biochemistry	2015, 81: 287-290	5.437	9	
22	Bottom-up control of fertilization on soil nematode communities differs between crop management regimes	李辉信/通讯作者	Soil Biology & Biochemistry	2016, 95: 198-201	5.437	3	
23	Enhanced gross nitrogen transformation rates and nitrogen supply in paddy field under elevated atmospheric carbon dioxide and temperature	熊正琴/通讯作者	Soil Biology & Biochemistry	2016, 94: 80-87	5.437	4	
24	Taxonomic resolution is a determinant of biodiversity effects in arbuscular mycorrhizal fungal communities	胡水金/通讯作者	Journal of Ecology	2017, 105: 219-228	6.499	0	
25	The molecular properties of biochar carbon released in dilute acidic solution and its effects on maize seed germination	潘根兴/通讯作者	Science of the Total Environment	2017, 576: 858-867	5.102	0	
26	Two degradation strategies for overcoming the recalcitrance of natural lignocellulosic xylan by polysaccharides-binding GH10 and GH11 xylanases of filamentous fungi	张瑞福/通讯作者	Environmental Microbiology	2017, 19: 1054-1064	5.965	0	

27	Resource availability modulates biodiversity-invasion relationships by altering competitive interactions	杨天杰/第一作者 韦中/通讯作者	Environmental Microbiology	2017, 19: 2984-2991	5.965	1	
28	The unseen rhizosphere root-soil-microbe interactions for crop production	张瑞福/第一作者	Current Opinion in Microbiology	2017, 34: 8-14	6.85	0	
29	Seasonal variation in the biocontrol efficiency of bacterial wilt is driven by temperature-mediated changes in bacterial competitive interactions	徐阳春/通讯作者	Journal of Applied Ecology	2017, 54: 1440-1448	5.989	0	
30	Alteration of the soil bacterial community during parent material maturation driven by different fertilization treatments	张瑞福/通讯作者	Soil Biology & Biochemistry	2016, 96: 207-215	5.437	2	

影响因子为期刊 5 年平均影响因子。

附表 8：知识产权情况表

序号	类型	知识产权名称	授权/申请	编号	授权/申请/批准时间	实验室固定人员	备注
1	发明专利	一株嗜热地芽孢杆菌 NJRC-14 及其微生物有机肥料	授权	ZL201310662410.8	2015-08-26	徐阳春	
2	发明专利	一种多效有机叶面调理剂的制备方法及应用	授权	ZL201410581967.3	2016-09-07	潘根兴	
3	发明专利	一株梨树枝条降解真菌及其菌剂	授权	ZL201410228275.0	2016-06-22	徐阳春	
4	发明专利	一株水稻秸秆降解真菌拟康宁木霉 ZJC-1 及其菌剂	授权	ZL201410229566.1	2016-06-08	徐阳春	
5	发明专利	一种加速玉米秸秆还田腐解的方法	授权	ZL201410233987.1	2016-03-02	徐阳春	

注："类型"包括"发明专利"、"实用新型专利"、"外观设计专利"、"国际标准"、"国家标准"、"医药新药证书"、"医疗器械注册证书"、"农药新药证书"、"兽药新药证书"、"动植物新品种审定"、"软件著作权"、"集成电路设计版权"、"植物新品种权"等。

3．服务经济社会发展

总结实验室对国家战略需求、地方经济社会发展、行业产业科技创新的贡献，以及产生的社会影响和效益。（1000 字以内）

实验室围绕低碳农业与温室气体排放研究，积极服务于国家农业温室气体排放清单编制和农业废弃物资源循环利用途径的地方社会经济发展需求，产生了积极的社会影响和效益。

（一）实验室加强农业温室气体排放研究，服务于国家农业温室气体排放清单编制。针对我国是全球第一淡水养殖大国，而淡水养殖湿地温室气体排放资料空白的实际情况，实验室研究方向一开展了我国典型淡水养殖湿地温室气体排放观测研究，填补了全球和我国相关原位观测通量资料的空白，为我国提高农业温室气体排放清单的科学性和完整性提供了科学依据和数据支撑。

（二）实验室加强农业废弃物资源循环利用的有机肥料化途径研究，引领了我国有机肥产业发展。实验室研究方向二研发出新型条垛式高效堆肥技术工艺，建立了新型条垛式高效堆肥技术工艺，并研发出相应的翻抛机设备，为集约化养殖场粪便无害化处理和堆肥资源化利用提供了整套技术工艺和设备，产生了显著的社会、经济和生态效益。研发出病死畜禽无害化处理和资源化利用的技术工艺，将病死畜禽高温下酸解成氨基酸和脂肪，后者全部用于生物有机肥制造中二次固体发酵所需的氨基酸和有效碳源，大大降低了生物有机肥企业的原料成本，为我国农业废弃物资源化利用提供了新途径。研发出一条作物秸秆运回后无需粉碎，直接好氧堆肥的技术工艺，他们研制出的“秸秆快腐营养激发剂”喷洒在秸秆上，一个月后秸秆全部腐熟成达标的商品有机肥，企业生产成本很低，为大规模利用作物秸秆快速制造商品有机肥提供了技术途径。

（三）实验室加强农业废弃物资源循环利用的生物质炭化途径研究，促进了我国秸秆炭化产业发展。实验室研究方向二研发出第二代生物质炭基肥的生产工艺技术，生产的生物质炭基肥具有延释缓效、抗逆抗病的良好功效，取得良好社会效益。该项技术为秸秆资源化增值利用、为农业减肥减药开辟了新的途径，并有望发展为新型生物质绿色工程产业技术。

4．支撑学科发展

简述实验室所依托学科的发展情况，从科学研究和人才培养两个方面分别介绍对学校学科建设发挥的支撑作用，以及推动学科交叉与新兴学科建设的情况。（800 字以内）

实验室依托的主干学科为农业资源与环境学科，农业资源与环境学科为国家一级重点学科，近年来先后入选江苏省优势学科（A 类）和国家“双一流”建设学科，在全国第三轮（2012）学科评估排名中排名第一和第四轮（2016）学科评估排名中排名为 A^+学科，是南京农业大学生态环境学科领域进入全球 ESI 前 1%的最主干支撑学科。实验室在科学研究和人才培养两个方面推动了学科发展，为农业资源与环科学科建设发挥了重要支撑作用。

（一）在科学研究方面

实验室目前承担了国家“十三五”重点研发专项、国家公益性行业（农业）专项、国家“973”项目课题、国家基金（杰青项目、面上和青年项目）等一批国家级项目，经费达 8300 多万元，支撑了农业资源与环境一级学科 5 个主干方向中的“农业废弃物资源化与生物学过程”和“陆地表层碳氮过程与全球变化”2 个方向。在农业废弃物资源化途径和土壤碳氮温室气体排放过程与机制等方面取得了重要科技创新成果，2015 至 2017 年获得国家科技进步二等奖 1 项，农业部一等奖 1 项，在 Global Change Biology、Environmental Science & Technology 等国际重要 SCI 刊物上发表了 180 余篇论文，多篇论文入选 ESI 高被引论文。实验室集聚了国家杰青、万人计划领军人才、千人计划特聘专家等多名国家级人才，为学科高端领军人才队伍建设提供了坚强支撑。

（二）在人才培养方面

实验室通过引进和培养，积极加强实验室青年骨干队伍建设，推动了学科人才队伍建设。实验室 3 名中青年骨干入选教育部新世纪人才，1 人入选中国科协青年托举人才和江苏省优青，2 人入选江苏省“青蓝工程”和 “333 工程”中青年学术骨干，为学科优化人才队伍结构和促进青年骨干人才成长提供了平台。此外，实验室每年招收博士生 10 名左右，硕士生 30 名左右。依托农业资源利用和生态学博士后流动站每年招收博士后 2-3 名，接受访问学者和海外留学生 1-2 名，形成了实验室较为完善的“本科-硕士-博士-留学生-博士后”创新人才培养体系。实验室博士生人均发表 SCI 论文 2.4 篇，所发论文期刊影响因子人均达 7.6。两篇博士学位论文获得江苏省优秀博士学位论文奖。

此外，实验室积极推动农业资源与环境、生态学和环境科学与工程等学科的交叉融合，围绕实验室低碳农业途径和温室气体减排的研究主题，通过基础研究、技术研发和工程示范的学科方向间合作研究，推动学科交叉，为南京农业大学生态环境学科领域进入全球 ESI 排名前 1%作出了贡献。

四、开放交流与运行管理

1．管理与运行

请简要介绍实验室内部规章制度建设、网站建设、日常管理工作、自主研究选题情况、学术委员会作用，实验室科研氛围和学术风气、有无违反学术道德的事件发生。（600 字以内）

实验室建立开放、流动的学术交流平台和人事管理机制，建立实验室学术委员会领导下的实验室主任负责制，形成固定与客座人员相结合、国内与国外人员相结合、长期与短期聘用相结合的实验室开放流动机制；建立公平竞争、分配合理的运行机制和高效、快速的组织协调和服务体系。秉承"诚朴勤仁"的校风，结合科学性、思想性、时代性的校园文化建设，以和谐的实验室团队文化、良好的人际环境和自由的学术氛围建设为核心，营造学术平等、鼓励创新、自由探索和宽容失败的实验室团队文化氛围。

实验室按照"开放、流动、联合、竞争"的总要求，成立建设领导小组、实验室管理小组和实验室学术委员会以加强实验室运行和管理。实验室管理小组负责实验室的日常运行和管理，实行领导小组和学术委员会领导下的实验室主任负责制。学术委员会由国内外知名专家学者组成,负责制定实验室学术发展方向,审核各项研究计划，指导博士研究生；全面监督实验室各项工作，定期考核研究进展，评审科研成果。实验室主任由正副主任组成，负责实施和管理实验室各项研究活动，提出科学研究计划，促进科研合作项目的形成，推动学科交叉，加强跨学科人才培养；组织各种学术活动，促进国际性学术交流，形成有显示度的科研成果。

附表 11：管理委员会人员名单

序号	职务	姓名	性别	年龄	所在部门	职称和职务	备注
1	主任	丁艳锋	男	52	南京农业大学校办	教授/副校长	
2	副主任	沈其荣	男	60	南京农业大学校办	教授/校学术委员会主任	
3	委员	俞建飞	男	46	南京农业大学科研院	副院长	
4	委员	周国栋	男	44	南京农业大学实验室与平台处	处长	
5	委员	徐国华	男	54	资源与环境科学学院	教授/院长	
6	委员	邹建文	男	47	资源与环境科学学院	教授/副院长	
7	委员	李井葵	男	50	南京农业大学实验室与平台处	实验室科科长	

附表 12：学术委员会人员名单

序号	职务	姓名	性别	职称	年龄	在国内外学术机构任职情况	国家级人才计划等荣誉	是否外籍
1	主　任	朱兆良	男	研究员	85	中科院南京土壤所	中科院院士	否
2	副主任	沈其荣	男	教　授	60	南京农业大学	国家教学名师	否
3	副主任	丁维新	男	研究员	55	中科院南京土壤所	国家杰青	否
4	委　员	吴金水	男	研究员	56	中科院亚热带农业生态研究所	国家杰青	否
5	委　员	蔡祖聪	男	教　授	59	南京师范大学	国家杰青	否
6	委　员	邹建文	男	教　授	47	南京农业大学	国家杰青	否
7	委　员	胡水金	男	教　授	55	南京农业大学	千人计划专家	是
8	委　员	郑循华	女	研究员	54	中科院大气物理所	国家杰青	否
9	委　员	刘学军	男	教　授	49	中国农业大学	国家杰青	否

2. 实验室安全管理

包括各项安全管理制度建立和运行情况、安全责任机制落实情况、资质和基本设施运行情况、安全知识和操作规范培训情况、危险化学品和易燃易爆有毒有害品管理、废弃科研实验室和危险品处理情况、安全教育及应急预案情况等。（1000字以内）

实验室认真落实学校有关实验室安全的各项管和运行制度，落实安全责任制，实验室主任为实验室安全责任第一人，规范培训实验室安全知识和操作规范，严格按照相关要求管理危险化学品和易燃易爆有毒有害品、试验废弃品和危险品处理处置、安全教育和应急预案情况。实验室认真执行学校相关制度文件，包括：（1）南京农业大学仪器设备管理办法；（2）南京农业大学实验室废弃危险化学品污染环境防治办法；（3）南京农业大学实验室危险化学品安全管理条例；（4）南京农业大学实验室工作规程；（5）南京农业大学实验室安全管理条例；（6）南京农业大学实验室安全用电管理规定；（7）南京农业大学化学、生物类实验室突发事件应急处置预案；(8) 南京农业大学实验室有毒、有害废弃物管理暂行规定。

为加强实验室管理，发挥实验室资源优势，实验室先后出台了一系列规章制度，主要包括：（1）江苏省低碳农业与温室气体减排重点实验室管理条例；（2）江苏省低碳农业与温室气体减排重点实验室仪器设备运行管理规定；（3）江苏省低碳农业与温室气体减排重点实验室科技奖励条例；（4）江苏省低碳农业与温室气体减排重点实验室开放课题管理条例；（5）江苏省低碳农业与温室气体减排重点实验室会议室管理办法。

3．开放、合作与交流

（1）开放课题设置情况

简述实验室在考核验收期内设置开放课题、主任基金概况。（600 字以内）

实验室建立开放、流动的学术交流平台和人事管理机制，建立实验室学术委员会领导下的实验室主任负责制，形成固定与客座人员相结合、国内与国外人员相结合、长期与短期聘用相结合的实验室开放流动机制；建立公平竞争、分配合理的运行机制和高效、快速的组织协调和服务体系。秉承“诚朴勤仁”的校风，结合科学性、思想性、时代性的校园文化建设，以和谐的实验室团队文化、良好的人际环境和自由的学术氛围建设为核心，营造学术平等、鼓励创新、自由探索和宽容失败的实验室团队文化氛围。

实验室在学术委员会领导下设置课题自由申请的开放机制。实验室在学术委员会领导下设置课题自由申请的开放机制。实验室开放课题设置遵循“有限目标、重点突出”的基本原则，实验室每年设置开放课题 1 项，每个课题资助 5 万元左右，重点支持本领域研究中地区性研究和交叉学科研究需要。课题开放主要以本实验室所承担的国家重点科研项目为依托，面向农业高校中相关研究单位，以区域特色研究和新的生长点研究为主要资助对象。

附表 9：开放课题设置情况

序号	课题名称	经费额度	承担人	承担人单位	标注实验室的论文数	课题设置年度
1	全球土壤呼吸原位观测资料的集成研究	5.0	陈书涛	南京信息工程大学	3	2015
2	外来植物入侵对土壤碳氮过程与温室气体排放的影响研究	5.0	张　令	江西农业大学	3	2016
3	外来植物对气候变化因子的响应研究	5.0	王　泓	安徽科技学院	1	2017

（2）国内外学术交流与合作情况

请列出实验室人员国内外学术交流与合作的主要活动，包括与国外研究机构共建实验室、承担重大国际合作项目或机构建设、参与国际重大科研计划、在国际重要学术会议做特邀报告的情况。请按国内合作与国际合作分类填写。（600 字以内）

实验室十分注重国内外学术交流与合作。在国内合作交流方面，实验室依托的农业资源与环境学科为国务院学位委员会学科评议组（农业资源与环境）召集人单位，每年举办全国同行的学术交流活动，在人才培养和科研创新等方面与全

国同行一起参与国家和国际学术咨商活动。实验室主任邹建文教授兼任教育部科技委农林学部委员、中国土壤学会青年工作委员会主任和江苏省土壤学会副理事长，每年牵头主办全国青土会和相关学术交流活动，方向带头人潘根兴教授积极参与我国低碳农业与生物质炭产业、农业应对气候变化的国家政策咨询活动，举办相关培训班，与国内同行加强学术交流。

在国际交流方面，实验室主要依托农业资源与环境的“111 创新引智基地”，每年参与承办创新基地的国际学术研讨会，聘任基地外方专家如 Pete Smith、Evan Siemann 等为实验室兼职教授，定期不定期来实验室进行学术交流。实验室方向二带头人胡水金教授为“千人计划”专家，美国北卡州立大学教授，国家学术交流频繁。实验室成员参加国际会议十分频繁，如 2017 年 9 月实验室 7 为成员参加了在英国洛桑试验站召开的第六届国际土壤有机质大会，4 名成员做了大会报告；实验室每年都举办“中国—东盟生物质炭生产与绿色农业应用研讨会”，并被国家外专局命名为“秸秆生物质炭绿色农业国家引进国外智力示范单位”。

附表 10：主办或承办大型学术会议情况

序号	会议名称	主办单位名称	会议主席	召开时间	参加人数	类别
1	农业资源与环境生物学利用国际研讨会	南京农业大学	沈其荣 James Tiedje	2015.10 2016.10	260 315	全球性
2	中国-东盟生物质炭生产与绿色农业应用研讨会	南京农业大学	潘根兴	2015.10 2016.11 2017.11	79 117 138	地区性

注：请按全球性、地区性、双边性、全国性等类别排序，并在类别栏中注明。

（3）仪器设备

简述实验室仪器设备的使用、大型仪器设备开放共享、研制新设备和升级改造旧设备等方面的情况。（800 字以内）

实验室具有液相色谱仪、气相色谱仪、原子吸收分光光度计、炭氮硫元素分析仪、X衍射仪、DGGE、荧光显微镜、液体发酵罐（150升）和固体发酵罐各1 套等3000余万元各类设备。此外，实验室所在的学院公共实验平台提供常规理化分析、微生物学、分子生物学及气相、液相、质谱、红外光谱等仪器分析条件，单价10万元以上仪器50多台，满足了常规实验理化和生物学性状研究的基本仪器设备条件。实验室通过各类科研项目、国家和江苏省优势学科平台学科建设进一步改善了平台测试设备条件，新添置800万的仪器设备，包括激光共聚焦显微镜、同位素质谱仪、ICP-MS等大型仪器，已经达到国际同类研发中心的先进水平。

附表 13：实验室科研仪器设备开放使用情况列表（不超过 20 台套）

序号	设备名称	厂家及型号	启用年月	原值（万元）	使用率（%）	开放共享机时数	
						校内	校外
1	野外 FACE 平台系统	美国理加公司（T-FACE）	2010.03	503.1	100	5600	0
2	X-射线衍射仪	日本 Rigaku 公司（D/max-B）	2014.07	210.0	70	2000	1000
3	高效液相色谱仪（3 台）	美国 WATERS 公司（WATERS 1525）/美国安捷伦公司（Agilent 1200）	2010.06	76.0	100	4600	2400
4	微生物液体发酵中试系统	瑞士比欧公司（:SUS304）	2015.10	180.0	60	2200	0
5	三重串联四极杆液-质谱联用仪	美国安捷伦公司（Agilent 6410）	2012.01	158.2	50	3820	1600
6	气相色谱仪（5 台）	美国安捷伦公司（Agilent 7890A）	2010.04	155.6	100	6000	1080
7	定量 PCR 仪（3 台）	美国 Bio-RAD 公司（S1000)/美国 Biolog 公司（Prism 7500）	2015.07	130.0	100	6000	3200
8	原子吸收分光光度仪（2）	日本日立公司（Z-8000）北京普析公司（TAS-986）	2011.04	65.3	80	5400	1600
9	光合作用测定仪（2 台）	美国 Li-Cor 公司（Li-cor6400）	2012.07	90.0	60	1200	0
10	元素分析仪 （2 台）	德国 Elementar 公司（VARIO MAX）	2017.12	95.6	100	5800	1900
11	总有机碳/总氮分析仪（2 台）	日本岛津公司（TOC-5000A）/德国耶拿公司（multi N/C 2100）	2010.08	85.0	100	4700	2200
12	流动注射分析仪（2 台）	德国 BRAN LUEBBE 公司(AutoAnalyer AA3）	2013.09	83.1	100	4800	1600
13	超速冷冻离心机（2 台）	美国贝克曼公司（OptimaL-100 K）	2012.08	80.0	50	1500	500
14	智能型傅立叶变换红外光谱仪	美国 Nicolet 公司（Nicolet 380）	2014.03	35.3	60	1800	700
15	电流放大器及显微操作器	美国马普公司（AXON-900A）	2016.02	35.1	45	1400	0

16	Leica 正置显微镜	德国 Leica 公司（DM 5000 B）	2016.02	30.0	45	2400	300
17	电位分析仪	美国安捷伦公司(Zetaprobe 7020)	2016.05	29.0	60	2900	0
18	卵母细胞异源表达系统	美嘉仪器股份有限公司（Oocyte Clamp Amplifier）	2016.06	25.4	60	3100	0
19	紫外交联仪	美国 Bio-RAD 公司（UVP HB-1000）	2017.01	25.2	60	900	0
20	全自动微生物鉴定仪	美国 Biolog 公司（MicroStation）	2017.09	20.7	80	1300	0

注：填写原值在 20 万元以上的科研仪器。

4．实验室文化建设

简述实验室促进高水平人才脱颖而出和原创性成果的产生、塑造实验室精神、营造浓厚的学术气氛情况，建立自我学习、团队协作、学术民主、宽松和谐、宽容失败情况，实验室开展科学普及的举措和效果。(1000 字以内)

实验室按照“开放、流动、联合、竞争”的总要求，成立建设领导小组、实验室管理小组和实验室学术委员会以加强实验室运行和管理。实验室管理小组负责实验室的日常运行和管理，实行领导小组和学术委员会领导下的实验室主任负责制。学术委员会由国内外知名专家学者组成,负责制定实验室学术发展方向,审核各项研究计划，指导博士研究生；全面监督实验室各项工作，定期考核研究进展，评审科研成果。实验室主任由正副主任组成，负责实施和管理实验室各项研究活动，提出科学研究计划，促进科研合作项目的形成，推动学科交叉，加强跨学科人才培养；组织各种学术活动，促进国际性学术交流，形成有显示度的科研成果。

实验室建立开放、流动的学术交流平台和人事管理机制，建立实验室学术委员会领导下的实验室主任负责制，形成固定与客座人员相结合、国内与国外人员相结合、长期与短期聘用相结合的实验室开放流动机制；建立公平竞争、分配合理的运行机制和高效、快速的组织协调和服务体系。秉承“诚朴勤仁”的校风，结合科学性、思想性、时代性的校园文化建设，以和谐的实验室团队文化、良好的人际环境和自由的学术氛围建设为核心，营造学术平等、鼓励创新、自由探索和宽容失败的团队文化氛围。

实验室积极开展科普知识宣传和设立开放日活动。实验室主任邹建文教授兼任教育部科技委农林学部委员，每年在全国进行 2-3 场科普和学术规范宣传活动，实验室每年设置 2-3 次开放日活动，接受优质生源基地高中生和在校大学生进入实验室参观交流，宣讲实验室科研活动，实验室科研创新成果多次在科技日报、农民日报、中国网等媒体宣传报道，提高实验室在全国影响力。实验室通过国际互访和参加国际学术交流会议等形式，促进国际学术交流，研究成果多次在国外网站进行亮点宣传报道。

五、审核意见

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<tr><td>实验室承诺所填内容属实，数据准确可靠。

数据审核人:
实验室主任:
（实验室章）
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相关附件（供参考）：

1.论文和专著证明：包括他引次数前 10 位的论文首页，及他引次数证明；专著封面和目录的复印件，如为合著，需说明具体情况。

2.国际会议特邀报告证明。

3.获奖证明，如获奖证书。

4.科研项目到账经费的财务证明。

5.重大科研项目佐证材料，如任务通知书复印件等。

6.发明专利及知识产权贡献证明，如新医药、新农药、新软件证书等国家级证书。

7.标准与规范参与编制证明。

8.成果转化证明。

9.政策建议和咨询报告成果证明。

10.各类科技人才、团队、群体称号的证明;

11.国际学术机构任职证明;

12.主办或者承办大型学术会议的证明，如会议通知复印件，代表性照片 1-2 张等。

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15. 其他可提供的佐证或说明材料。

Global Change Biology

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A meta-analysis of fertilizer-induced soil NO and combined NO+N_2O emissions

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Abstract

Soils are among the important sources of atmospheric nitric oxide (NO) and nitrous oxide (N_2O), acting as a critical role in atmospheric chemistry. Updated data derived from 114 peer-reviewed publications with 520 field measurements were synthesized using meta-analysis procedure to examine the N fertilizer-induced soil NO and the combined NO+N_2O emissions across global soils. Besides factors identified in earlier reviews, additional factors responsible for NO fluxes were fertilizer type, soil C/N ratio, crop residue incorporation, tillage, atmospheric carbon dioxide concentration, drought and biomass burning. When averaged across all measurements, soil NO-N fluxes were estimated to be 4.06 kg ha^{-1} yr^{-1}, with the greatest (9.75 kg ha^{-1} yr^{-1}) in vegetable croplands and the lowest (0.11 kg ha^{-1} yr^{-1}) in rice paddies. Soil NO emissions were more enhanced by synthetic N fertilizer (+38%), relative to organic (+20%) or mixed N (+18%) sources. Compared with synthetic N fertilizer alone, synthetic N fertilizer combined with nitrification inhibitors substantially reduced soil NO emissions by 81%. The global mean direct emission factors of N fertilizer for NO (EF_{NO}) and combined NO+N_2O (EF_c) were estimated to be 1.16% and 2.58%, with 95% confidence intervals of 0.71–1.61% and 1.81–3.35%, respectively. Forests had the greatest EF_{NO} (2.39%). Within the croplands, the EF_{NO} (1.71%) and EF_c (4.13%) were the greatest in vegetable cropping fields. Among different chemical N fertilizer varieties, ammonium nitrate had the greatest EF_{NO} (2.93%) and EF_c (5.97%). Some options such as organic instead of synthetic N fertilizer, decreasing N fertilizer input rate, nitrification inhibitor and low irrigation frequency could be adopted to mitigate soil NO emissions. More field measurements over multiyears are highly needed to minimize the estimate uncertainties and mitigate soil NO emissions, particularly in forests and vegetable croplands.

Keywords: emission factor, fertilizer, meta-analysis, nitric oxide, nitrous oxide, trace gas

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Introduction

Among the trace gases of great concern, nitric oxide (NO) and nitrous oxide (N_2O) are involved in the production and consumption of atmospheric oxidants such as ozone (O_3) and hydroxyl radical (OH) (Williams *et al.*, 1992). They are the potential precursors of photochemical formation of nitric acid (HNO_3) that is the fast-growing component of acidic deposition, directly responsible for the acidification and eutrophication of terrestrial ecosystems (IPCC, 2013). Recently, the anthropogenic activities have greatly altered the background atmospheric NO and N_2O concentration, indirectly or directly contributing to changes in concentration of atmospheric greenhouse gases and tropospheric chemistry (Bouwman *et al.*, 2002a).

Soils have been recognized as an important source of atmospheric NO (Davidson & Kingerlee, 1997; Bouwman *et al.*, 2002a,b; Yan *et al.*, 2005; Stehfest & Bouwman, 2006; Pilegaard, 2013). Soil NO is mainly produced through the microbial processes of nitrification and denitrification. The nitrification predominates the pathways for soil NO emission, especially in tropical and subtropical climate regions (Godde & Conrad, 2000; Laville *et al.*, 2005; Stehfest & Bouwman, 2006). The controlling factors of soil NO emissions have been reviewed earlier, including N fertilizer application rate, soil N content, climate, land cover type, soil organic carbon content, pH and bulk density, drainage and length of the measurement period (Bouwman *et al.*, 2002a,b; Yan *et al.*, 2003a,b; Stehfest & Bouwman, 2006; Pilegaard, 2013).

In the past decades, a great many field measurements of soil NO fluxes have been taken in various ecosystems. Some earlier studies based on flux measurement data have developed statistic models to quantify global fertilizer-induced soil NO emissions (Bouwman *et al.*, 2002a; Yan *et al.*, 2003a; Stehfest & Bouwman, 2006). Parallel to these statistical models, it is useful to synthesize the flux measurement data with meta-analysis

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example, IAA, low Pi in the soil, and *RSL4* expression are all interlinked (Figure 1).

Recently, two novel RSL4 properties were uncovered. First, RSL4 is able to self-activate, enhancing its own expression [5]. Second, the rate of RSL4 synthesis determines the final size of the root hair cell and, because it contains a D-BOX motif, its protein stability is regulated by 26S proteasome degradation [10]. Accordingly, a mutated form of RSL4 that is stable and resistant to proteolysis develops abnormally long root hairs [10]. More importantly, RSL4 controls the expression of 124 genes (84 genes determined in [9], 29 in [11], and 11 in [12]) containing a root hair-specific *cis*-element (RHE) in their regulatory regions [5]. These RSL4-activated genes function in ROS homeostasis, cell wall synthesis and remodeling, metabolism, and signaling, and represent the smallest subset of genes necessary to trigger root hair growth [5]. Together, these properties make RSL4 a key master regulator of final cell size that integrates environmental, hormonal, and developmental cues (Figure 1). Other TFs and transcriptional components not described here (e.g., LRL1-LRL3, mediator 25/PFT1, etc.) act in an RSL4-independent manner to regulate the expression of root hair genes to trigger its growth.

Concluding Remarks

In summary, recent findings highlighted here represent a significant step toward understanding RSL4-mediated regulation of cell size. Nevertheless, it remains to be determined how *RSL4* expression is controlled or balanced under conflicting growth signals or when plants are exposed to additive or synergistic cues. Thus, detailed studies of the effect of each individual factor and combined signals on *RSL4* expression are needed to unravel how the cell sizing process is fine-tuned. The identification and dissection of all components involved in this regulatory network (Figure 1) remain tasks for future research, and will require a concerted effort by the plant research community.

Author Contributions

J.M.E. conceived the project and, with E.M., C.B., S.P.D.J., and S.M., wrote the article. E.M., C.B., and S.P.D.J. also provided technical assistance.

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References

1. Lee, R.D.-W. and Cho, H.-T. (2013) Auxin, the organizer of the hormonal/environmental signals for root hair growth. *Front. Plant Sci.* 4, 448
2. Velasquez, S.M. et al. (2016) Auxin and cellular elongation. *Plant Physiol.* 170, 1206–1215
3. Zhang, S. et al. (2016) Multiple phytohormones promote root hair elongation by regulating a similar set of genes in the root epidermis in *Arabidopsis*. *J. Exp. Bot.* 67, 6363–6372
4. Lin, Q. et al. (2015) GLABRA2 directly suppresses basic helix-loop-helix transcription factor genes with diverse functions in root hair development. *Plant Cell* 27, 2894–2906
5. Huang, Y. et al. (2017) Tracheophytes contain conserved orthologs of a basic helix-loop-helix transcription factor to modulate ROOT HAIR SPECIFIC genes. *Plant Cell* 29, 39–53
6. Pires, N.D. et al. (2013) Recruitment and remodeling of an ancient gene regulatory network during land plant evolution. *Proc. Natl. Acad. Sci. U.S.A.* 110, 9571–9576
7. Mangano, S. et al. The molecular link between auxin and ROS-controlled root hair growth. *Proc. Natl. Acad. Sci. U.S.A.* (in press)
8. Rymen, B. (2017) ABA suppresses root hair growth via the OBP4 transcriptional regulator. *Plant Physiol.* 173, 1750–1762
9. Yi, K. et al. (2010) A basic helix-loop-helix transcription factor controls cell growth and size in root hairs. *Nat. Genet.* 42, 264–267
10. Datta, S. et al. (2015) Intensity of a pulse of RSL4 transcription factor synthesis determines *Arabidopsis* root hair cell size. *Nat. Plants* 1, 15138
11. Vijayakumar, P. et al. (2016) ROOT HAIR DEFECTIVE SIX-LIKE4 (RSL4) promotes root hair elongation by transcriptionally regulating the expression of genes required for cell growth. *New Phytol.* 212, 944–953
12. Won, S.K. et al. (2009) Cis-element and transcriptome-based screening of root hair-specific genes and their functional characterization in *Arabidopsis*. *Plant Physiol.* 150, 1459–1473

and boron (B), and catechol, also stimulate root hair cell growth. Since RSL4 contains a D-BOX motif in its protein sequence, it is under 26S proteasomal degradation, which regulates its lifetime. RSL4 integrates internal and external cues by triggering the expression of a core of RHE genes (~124 putative direct targets) to control root hair cell size. In addition, other TFs (e.g., LRL1-LRL3) also regulate root hair gene expression in an RSL4-independent manner. Abbreviations: Aux-RE, auxin responsive element; CYCP, P-type cycline; D, D-BOX motif (RXXLXXXXN); EXP, expansins; GTs, glycosyltransferases; LRL, *Lotus japonicus* Roothairless Like; LRX, leucine-rich extensin; NAGS, amino-acid acetyltransferase; PER, type-III peroxidases; PRP, proline-rich proteins; RBOH, respiratory burst oxidase homolog proteins; RHE, root hair-specific element; RIC, Rop-interactive CRIB motif-containing protein; RLKs, receptor-like kinases; RNS, rinonuclease; TET, tetraspanin.

Spotlight

Plant Breeding Goes Microbial

Zhong Wei[1] and Alexandre Jousset[1,2,*]

Plant breeding has traditionally improved traits encoded in the plant genome. Here we propose an alternative framework reaching novel phenotypes by modifying together genomic information and plant-associated microbiota. This concept is made possible by a novel technology that enables the transmission of endophytic microbiota to the next plant generation.

Plant Breeding for Sustainable Food Production

Feeding a growing human population without jeopardizing resources is one of the major challenges of future decades. Breeding better plants is an essential part of the solution. Plants can be bred for a range of characteristics needed for low-input, high-yield conditions. They may be selected for growth, nutritional quality, pathogen immunity, or stress tolerance. However, genetic improvement is a complicated process made even harder by the prevailing regulations. Help may come from the microscopic world. Traditionally, plants have been bred by altering their genomic information with little consideration of their interaction with surrounding organisms. Recently, a paradigm shift has taken place by considering plants as a holobiont, an ecological and evolutionary unit encompassing both the host and its associated microbiome [1]. Plants are associated with billions of bacteria and fungi that colonize inside as well as outside surfaces, such as roots, vascular vessels, and leaves [2]. Plant-associated microbiota play a fundamental role in the regulation of plant physiology and affect a range of traits involved in plant yield. Some microbial species alter the hormonal balance by producing growth hormones such as auxin or gibberellin or by reducing levels of the stress-response hormone ethylene. Other microbiota stimulate plant immunity, shifting resource allocation from growth to defense pressure [2]. Together, plant–microbe interactions can generate a range of new phenotypes without altering plant genomic information.

Given the interactive and far-reaching effects of hormonal levels on plant phenotype, microbial-induced shifts have opened a new gamut of easily reachable combinations for plant traits. In addition, some microbes provide services to the plant that can be used to replace traits lost during breeding. By making soil nitrogen, phosphorus, or iron available to the plant, root-associated microbes may and enhancing plant growth and nutrition in low input systems. By producing antibiotics, some other microbes may protect the plant from diseases against which the plant shows no or limited immunity [2].

The past years have witnessed a growing interest in considering microbiota during the breeding of new plants varieties [3,4]. For instance, selecting plants efficiently recruiting taxa suppressing pathogens [5] may alleviate the need to build disease resistance into the plant genome itself. However, the complexity of the microbiome and the still limited knowledge on the mechanisms allowing a plant to control its associated microbial communities [6,7] makes it challenging to predict microbiome transmission and function in the next generation.

We therefore propose a complementary approach: a holobiont-level breeding strategy in which microbes are one of the direct targets of the selection process that help achieve a desired plant phenotype (Figure 1).

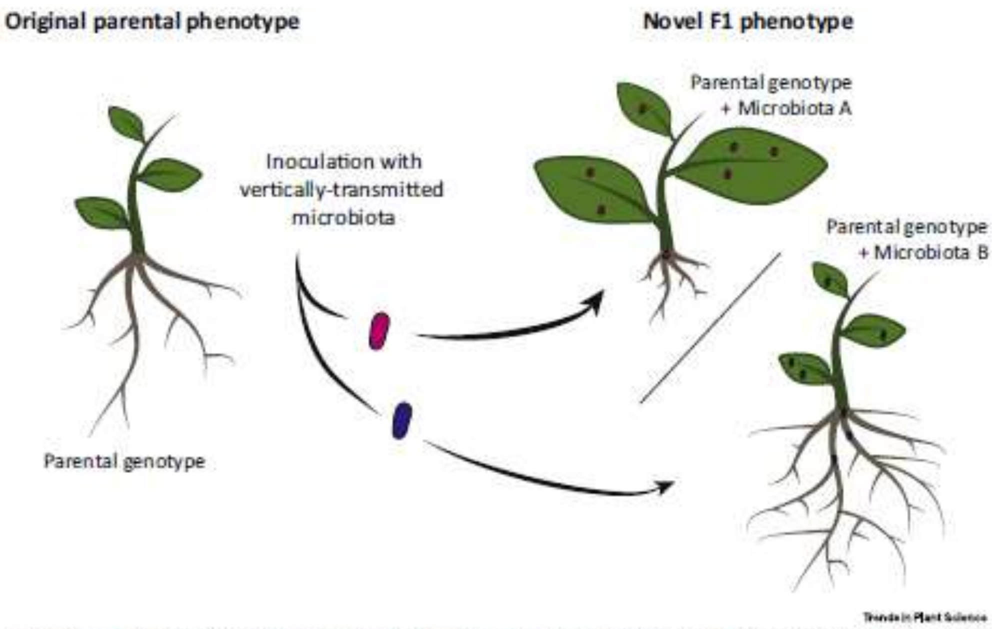

Figure 1. Conceptual Use of Vertically-transmitted Microbiota as a Basis for a Holobiont-level Breeding. The parental plant genotype can be inoculated with microbes that can modify various life history traits of the plant. Thanks to new developments enabling reliable microbial transmission to the next plant generation, the desired plant phenotype can be obtained by a combination of host- and microbial encoded traits that form together an inheritable unit.

Environmental Science & Technology

Article

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Methane and Nitrous Oxide Emissions Reduced Following Conversion of Rice Paddies to Inland Crab–Fish Aquaculture in Southeast China

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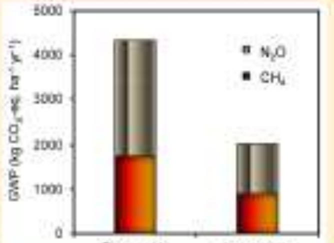
Jiangsu Key Laboratory of Low Carbon Agriculture and GHGs Mitigation, College of Resources & Environmental Sciences, Nanjing Agricultural University, Nanjing 210095, China

Supporting Information

ABSTRACT: Aquaculture is an important source of atmospheric methane (CH_4) and nitrous oxide (N_2O), while few direct flux measurements are available for their regional and global source strength estimates. A parallel field experiment was performed to measure annual CH_4 and N_2O fluxes from rice paddies and rice paddy-converted inland crab–fish aquaculture wetlands in southeast China. Besides N_2O fluxes dependent on water/sediment mineral N and CH_4 fluxes related to water chemical oxygen demand, both CH_4 and N_2O fluxes from aquaculture were related to water/sediment temperature, sediment dissolved organic carbon, and water dissolved oxygen concentration. Annual CH_4 and N_2O fluxes from inland aquaculture averaged 0.37 mg m^{-2} h^{-1} and 48.1 μg m^{-2} h^{-1}, yielding 32.57 kg ha^{-1} and 2.69 kg N_2O–N ha^{-1}, respectively. The conversion of rice paddies to aquaculture significantly reduced CH_4 and N_2O emissions by 48% and 56%, respectively. The emission factor for N_2O was estimated to be 0.66% of total N input in the feed or 1.64 g N_2O–N kg^{-1} aquaculture production in aquaculture. The conversion of rice paddies to inland aquaculture would benefit for reconciling greenhouse gas mitigation and agricultural income increase as far as global warming potentials and net ecosystem economic profits are of concomitant concern. Some agricultural practices such as better aeration and feeding, and fallow season dredging would help to lower CH_4 and N_2O emissions from inland aquaculture. More field measurements from inland aquaculture are highly needed to gain an insight into national and global accounting of CH_4 and N_2O emissions.



INTRODUCTION

Methane (CH_4) and nitrous oxide (N_2O) are two major potent long-lived atmospheric greenhouse gases (GHGs) that exhibit relative global warming potential (GWP) of 265 and 28 times that of carbon dioxide (CO_2) on mass basis over the 100 year time horizon, respectively.[1] Agricultural wetlands such as rice paddies and aquaculture wetlands are significant sources of atmospheric CH_4 and N_2O. In agricultural wetlands, the periodic waterlogging/drainage alteration episodes can create suitable soil environment and intensive organic material and nitrogen fertilizer inputs provide much substrate for CH_4 and N_2O, respectively.[2–5] While agricultural wetlands release significant amounts of CH_4 and N_2O to the atmosphere, the changes in agricultural land use would have potentials for mitigating the net emission of CO_2 equivalents through decreasing CH_4 and N_2O emissions and/or enriching soil organic carbon pools in the present of dissolved oxygen.[2–4]

As a typical agricultural wetland, rice paddies have been well documented as a major source of atmospheric CH_4 and can release substantial N_2O, due to water regime and organic and inorganic fertilizer inputs.[3,9–11] China is one of the most important rice-producing countries in the world, accounting for 20% of the world's rice production area and 23% of all cultivated land in China.[12] A great many field measurements and model studies have focused on CH_4 and N_2O emissions from rice paddies in China, dedicating to total CH_4 and N_2O estimates of 6−10 Tg yr^{-1} and 32−51 Gg N_2O–N yr^{-1} in Chinese rice paddies, respectively.[10–15]

China is also the largest aquaculture producer in the world, which has been responsible for most of the growth in global fish availability, with the annual aquaculture production growth rate of 5.5% in 2000−2012.[16] In the past decade, inland aquaculture wetlands have been locally advocated to meet its increasing market demands and gain higher economic returns in China, representing 60% of the world total of inland aquaculture production in 2012.[16] Due to space and resource limitations in southeast China, in particular, some rice paddies have been increasingly converted to inland pond aquaculture wetlands where crab, shrimp and fish are cultured with sufficient oxygen, freshwater and feed.[17] The area for inland pond aquaculture in China totaled 2.57 million hectares, and more than half of which (around 1.32 million hectares) was converted from rice paddies because inland aquaculture food as a vital source of protein and essential nutrients had much higher traded price in the market.[18]

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Response of soil carbon dioxide fluxes, soil organic carbon and microbial biomass carbon to biochar amendment: a meta-analysis

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Abstract

Biochar as a carbon-rich coproduct of pyrolyzing biomass, its amendment has been advocated as a potential strategy to soil carbon (C) sequestration. Updated data derived from 50 papers with 395 paired observations were reviewed using meta-analysis procedures to examine responses of soil carbon dioxide (CO_2) fluxes, soil organic C (SOC), and soil microbial biomass C (MBC) contents to biochar amendment. When averaged across all studies, biochar amendment had no significant effect on soil CO_2 fluxes, but it significantly enhanced SOC content by 40% and MBC content by 18%. A positive response of soil CO_2 fluxes to biochar amendment was found in rice paddies, laboratory incubation studies, soils without vegetation, and unfertilized soils. Biochar amendment significantly increased soil MBC content in field studies, N-fertilized soils, and soils with vegetation. Enhancement of SOC content following biochar amendment was the greatest in rice paddies among different land-use types. Responses of soil CO_2 fluxes and MBC to biochar amendment varied with soil texture and pH. The use of biochar in combination with synthetic N fertilizer and waste compost fertilizer led to the greatest increases in soil CO_2 fluxes and MBC content, respectively. Both soil CO_2 fluxes and MBC responses to biochar amendment decreased with biochar application rate, pyrolysis temperature, or C/N ratio of biochar, while each increased SOC content enhancement. Among different biochar feedstock sources, positive responses of soil CO_2 fluxes and MBC were the highest for manure and crop residue feedstock sources, respectively. Soil CO_2 flux responses to biochar amendment decreased with pH of biochar, while biochars with pH of 8.1–9.0 had the greatest enhancement of SOC and MBC contents. Therefore, soil properties, land-use type, agricultural practice, and biochar characteristics should be taken into account to assess the practical potential of biochar for mitigating climate change.

Keywords: biochar, carbon dioxide, climate change, microbial biomass carbon, soil organic carbon

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Introduction

Atmospheric carbon dioxide (CO_2) is the most important potent greenhouse gas (GHG) with a potential radiative forcing of 1.66 W m^{-2} that contributes to current global warming and impacts the earth's climate system (Forster *et al.*, 2007; Shindell *et al.*, 2009). Mitigation of CO_2 release from soils has been generally achieved by enhancing CO_2 removal from the atmosphere (sequestration), reducing emissions, and avoiding (or displacing) emissions (Smith *et al.*, 2008). Soil carbon (C) sequestration through selected soil management practice (e.g., crop residue or biochar amendment) has been proposed as a potential alternative to mitigate the rise of atmospheric CO_2 (Lal, 1999; Pan *et al.*, 2003; Mosier *et al.*, 2006; Smith *et al.*, 2008; Lu *et al.*, 2009; Shang *et al.*, 2011).

Biochar is a carbon-rich coproduct of pyrolyzing biomass subject to high-temperature and oxygen-deprived conditions for biofuel production (Lehmann, 2007a; Laird *et al.*, 2009) and has been advocated as a potential management strategy to improve soil quality, increase crop yield, and enhance soil carbon sequestration in fields (Marris, 2006; Lehmann, 2007b; Laird, 2008; Woolf *et al.*, 2010; Case *et al.*, 2014). Several recent laboratory or field studies have suggested that biochar might have the potential to mitigate climate change by increasing soil C sequestration and/or reducing GHG emissions (e.g., soil CO_2 fluxes) from soils (Lehmann, 2007b;

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RESEARCH REVIEW

Biochar stability in soil: meta-analysis of decomposition and priming effects

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Abstract

The stability and decomposition of biochar are fundamental to understand its persistence in soil, its contribution to carbon (C) sequestration, and thus its role in the global C cycle. Our current knowledge about the degradability of biochar, however, is limited. Using 128 observations of biochar-derived CO_2 from 24 studies with stable (^{13}C) and radioactive (^{14}C) carbon isotopes, we meta-analyzed the biochar decomposition in soil and estimated its mean residence time (MRT). The decomposed amount of biochar increased logarithmically with experimental duration, and the decomposition rate decreased with time. The biochar decomposition rate varied significantly with experimental duration, feedstock, pyrolysis temperature, and soil clay content. The MRTs of labile and recalcitrant biochar C pools were estimated to be about 108 days and 556 years with pool sizes of 3% and 97%, respectively. These results show that only a small part of biochar is bioavailable and that the remaining 97% contribute directly to long-term C sequestration in soil. The second database (116 observations from 21 studies) was used to evaluate the priming effects after biochar addition. Biochar slightly retarded the mineralization of soil organic matter (SOM; overall mean: −3.8%, 95% CI = −8.1–0.8%) compared to the soil without biochar addition. Significant negative priming was common for studies with a duration shorter than half a year (−8.6%), crop-derived biochar (−20.3%), fast pyrolysis (−18.9%), the lowest pyrolysis temperature (−18.5%), and small application amounts (−11.9%). In contrast, biochar addition to sandy soils strongly stimulated SOM mineralization by 20.8%. This indicates that biochar stimulates microbial activities especially in soils with low fertility. Furthermore, abiotic and biotic processes, as well as the characteristics of biochar and soils, affecting biochar decomposition are discussed. We conclude that biochar can persist in soils on a centennial scale and that it has a positive effect on SOM dynamics and thus on C sequestration.

Keywords: black carbon, C sequestration, climate change, priming effect, pyrogenic organic matter, soil respiration

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Introduction

Biochar, the carbonaceous residue of pyrolyzed organic materials under low oxygen conditions, has gained increasing attention in the last decade. Biochar is used for increasing soil carbon (C) sequestration (Lehmann *et al.*, 2006; Schmidt *et al.*, 2011), soil remediation (Ahmad *et al.*, 2014; Zhang & Ok, 2014), greenhouse gas emissions mitigation (Woolf *et al.*, 2010; Gurwick *et al.*, 2013), as well as improving soil fertility and crop yields (Jeffery *et al.*, 2011; Biederman & Harpole, 2013). Notably, its importance as a supply-side mitigation option is for the first time highlighted and summarized in the latest Intergovernmental Panel on Climate Change report (Smith *et al.*, 2014).

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A recent modeling study has demonstrated that sustainable biochar production could help reduce net greenhouse gas emissions by a maximum of 1.8 Pg CO_2-C equivalent annually without penalizing ecosystem stability and food security; the inert C of biochar is the largest contributor because of its highly stable characteristic (Woolf *et al.*, 2010). The biochemical stability of biochar is crucial mainly due to its longevity in soil after application and its long-term maintenance of fertility (Glaser *et al.*, 2002; Lehmann *et al.*, 2009). It remains unclear, however, to what extent biochar is degraded and what its concomitant effects on native soil organic matter (SOM) turnover and other cascading impacts are (Lehmann *et al.*, 2011; Ameloot *et al.*, 2013; Lorenz & Lal, 2014). Although the available studies have reviewed the fate of biochar in various environments (Schmidt & Noack, 2000; Forbes *et al.*, 2006; Preston &

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Effects of organic–inorganic compound fertilizer with reduced chemical fertilizer application on crop yields, soil biological activity and bacterial community structure in a rice–wheat cropping system

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Core microbiome

ABSTRACT

The development of more stable and sustainable agroecosystems for improving food production has caused wide public concern in recent years. In the present study, we conducted a field experiment to investigate the effect of pig manure organic–inorganic compound fertilizer with reduced chemical fertilizer on the crop yields, soil physicochemical properties, biological activities and bacterial community structure in a rice–wheat cropping system over two crop seasons (rice and wheat). The results showed that at all sampling times, this fertilizer regime enhanced the soil nutrient availability, microbial biomass, enzymatic activities, and soil nitrogen processes and, to some extent, promoted crop yields. Across all soil samples, bacterial communities were dominated by *Proteobacteria*, *Acidobacteria*, and *Chloroflexi* at the phylum level. Hierarchical cluster analysis based on the weighted UniFrac distance revealed that the bacterial community structures were strongly separated by the sampling time, and the treatments in the wheat harvest soils. A Venn diagram of shared OTUs showed a core microbiome across different treatments and sampling times, in which the relative abundance of each abundant phylum (class) was stable in the different treatments and at different sampling times. Specifically, the relative abundance of *Alphaproteobacteria*, *Gammaproteobacteria*, *Nitrospirae*, *Bacteroidetes*, and *Actinobacteria* was largely and particularly enriched under the organic–inorganic compound fertilizer regime, indicating that soil functions, such as nitrification and the turnover of organic matter, might be strengthened under this treatment. Collectively, these results indicate that the application of organic–inorganic compound fertilizer may reduce chemical fertilizer use and improve the long-term productivity and sustainability of agroecosystems.

1. Introduction

The rice (*Oryza sativa* L.)-wheat (*Triticum aestivum* L.) cropping system, which covers an area ranging from 9.5 to 13.5 million ha, is a long-established grain production system in China and is considered to be of utmost importance for China's food security and livelihood (Gupta et al., 2003). Since the early 1980s, the productivity of rice and wheat in China has increased dramatically. This has mainly been attributed to the introduction of high-yielding varieties and the increased input of chemical fertilizers (Ladha et al., 2004; National Bureau of Statistics of China, 2009). Recently, concerns have been raised regarding the stagnation and even decline in the productivity and sustainability of this cropping system (Ladha et al., 2003; Mandal et al., 2003). Therefore, to meet the ever-increasing food demand in China, the development of highly productive and sustainable food production practices is becoming increasingly important.

A rice-wheat cropping system is a nutrient exhaustive system that requires appropriate fertilizer management to maintain soil productivity, improve plant nutrition, and increase crop yields. Organic fertilizers are known to improve soil quality and structure

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Consistent increase in abundance and diversity but variable change in community composition of bacteria in topsoil of rice paddy under short term biochar treatment across three sites from South China

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ABSTRACT

Biochar functionality related to soil microbial community changes has not yet been fully understood. In this study, we present a cross site field experiment on bacterial community changes of rice paddies among three sites (Jiangxi province, JX; Hunan province, HN; and Sichuan province, SC) from South China with biochar amended (BSA) at 0, 20 and 40 t ha^{-1} before rice plantation in 2010. Changes in bacterial abundance and diversity of topsoil (0–15 cm) sampled at rice harvest were assessed. Increases in soil pH, soil organic carbon, total N, soil microbial biomass, as well as bacterial gene copy numbers and diversity indices (phylogenetic diversity, Shannon, Chao1 and OTU richness) were consistently observed under BSA at 40 t ha^{-1}, though generally insignificant at 20 t ha^{-1} across the sites. Cluster analysis of both terminal restriction fragment length polymorphism (T-RFLP) profiles and pyrosequencing of the 16S gene indicated a strong impact of biochar on bacterial community composition, though the changes were variable across the sites. In particular, BSA at 20 and 40 t ha^{-1} greatly increased the relative abundance of Betaproteobacteria (by 54% and 80%) and Deltaproteobacteria (by 164% and 151%) in JX while decreased Betaproteobacteria (by 46% and 52%) and increased Chloroflexi (by 27% and 61%) in SC site, respectively. However, no significant changes were detected in HN site. In addition, some significant but variable changes were observed in the abundance of nitrifying, denitrifying and N-fixing bacteria groups with biochar addition among sites. This study suggested a potential role of biochar in enhancing bacterial abundance, community diversity and modifying the community compositions, particularly of the bacteria involved in N cycling. However, changes in soil microbial structure and functioning related to biochar treatment deserve further studies.

1. Introduction

Incorporating of biochar of crop residues via pyrolysis into croplands has been considered a promising option to enhance soil organic carbon (SOC) sequestration and sustain crop productivity (Lehmann, 2007; Sohi, 2012). In comparison to field burning of crop residues, this approach could allow better controlled and cleaner combustion, reduce CO_2 emission, improve the recycling of nutrients and offer renewable energy (Knoblauch et al., 2011; Clare et al., 2014). The role of biochar soil amendment (BSA) had been well addressed in reducing non-CO_2 greenhouse gas (GHG) emissions in a number of field experiments (Hammond et al., 2013; Liu X.-y. et al., 2012; Zhang et al., 2010, 2013). Being usually alkaline, high in negatively-charged surface area and rich in recalcitrant carbon with highly porous structure, biochar could generally enhance crop productivity (Jones et al., 2012; Major et al., 2010) by a single or a combination of liming, moistening, aggregating and possible nutrient enhancing effects (Liu et al., 2013, 2014). However, biochar's functionality related to soil biochemical process associated with microorganisms is still poorly understood (Lehmann et al., 2011).

Functioning and sustaining soil fertility is known to be governed largely by the activity of soil microorganisms (Anderson,

Abbreviations: BSA, biochar soil amendment; SOC, soil organic carbon; MBC, microbial biomass carbon; MBN, microbial biomass nitrogen; T-RFLP, terminal restriction fragment length polymorphism; qPCR, quantitative real-time PCR.

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Carbon footprint of grain crop production in China – based on farm survey data

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ABSTRACT

Quantifying the carbon footprint of crop production can help identify key options to mitigate greenhouse gas emissions from agriculture. Using farm survey data from eastern China, the carbon footprints of three major grain crops (rice, wheat and maize) were assessed by quantifying the greenhouse gas emissions from individual inputs and farming operations with a full life cycle assessment methodology. The farm carbon footprint in terms of farm area was estimated to be 6.0 ± 0.1, 3.0 ± 0.2, and 2.3 ± 0.1 t CO_2-eq ha^{-1}, and the product carbon footprint in terms of grain produced was 0.80 ± 0.02, 0.66 ± 0.03, and 0.33 ± 0.02 t CO_2-eq t^{-1} grain for rice, wheat and maize, respectively. Use of synthetic nitrogen fertilizers contributed 44–79% and mechanical operations 8–15%, of the total carbon footprints. Irrigation and direct methane emission made a significant contribution by 19% and by 25%, on average respectively for rice production. However, irrigation was only responsible for 2–3% of the total carbon footprints in wheat and maize. The carbon footprints of wheat and maize production varied among climate regions, and this was explained largely by the differences in inputs of nitrogen fertilizers and mechanical operations to support crop management. Moreover, a significant decrease (22–28%) in the product carbon footprint both of wheat and maize was found in large sized farms, compared to smaller ones. This study demonstrated that carbon footprint of crop production could be affected by farm size and climate condition as well as crop management practices. Improving crop management practices by reducing nitrogen fertilizer use and developing large scaled farms with intensive farming could be strategic options to mitigate climate change in Chinese agriculture.

1. Introduction

Globally, the atmospheric concentrations of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) have increased significantly, almost certainly as a consequence of anthropogenic activities since 1750 (IPCC, 2007, 2013). The increase in CO_2 emissions can be primarily attributed to fossil fuel combustion and land use change, while CH_4 and N_2O emissions have come mainly from agriculture (Smith et al., 2008). Thus the world agriculture sector has become increasingly important as a global solution to stabilize anthropogenic greenhouse gas (GHG) emissions. Quantifying carbon footprint (CF) has been widely accepted as an approach that can address the potential impact of production sectors or human activities on climate change, and can be assessed through characterizing the amount of greenhouse gas emissions "from cradle to grave" induced by a product or an activity based on the Life Cycle Assessment (LCA) principle (Wiedmann and Minx, 2008; WRI, 2010; BSI, 2008). Accordingly, CFs in agriculture have been used to explore mitigation measures in terms of GHG emissions associated with farming practices using the LCA method up to the farm gate (Lal, 2004a; Dubey and Lal, 2009).

Changes in land use and production systems in agriculture have increasingly been assessed for their potential impacts on climate

Abbreviations: CF, carbon footprint; PCF, farm carbon footprint; GHG, greenhouse gas; LCA, life cycle assessment; PCF, product carbon footprint.

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Combined effects of nitrogen fertilization and biochar on the net global warming potential, greenhouse gas intensity and net ecosystem economic budget in intensive vegetable agriculture in southeastern China

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HIGHLIGHTS

- Combined field effects of N & biochar on N_2O, net GWP, GHGI and NEEB were assessed.
- N didn't increase vegetable yield nor NEEB but increased net GWP and GHGI.
- Biochar increased vegetable yield and NEEB while reduced net GWP and GHGI.

GRAPHICAL ABSTRACT

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ABSTRACT

Field experiments were conducted to determine the effects of nitrogen (N) fertilization and biochar addition on the net global warming potential (net GWP), greenhouse gas intensity (GHGI) and net ecosystem economic budget (NEEB). These experiments were conducted in an intensive vegetable field with 4 consecutive vegetable crops in 2012 and 2013 in southeastern China. The experiment was conducted with a 3^2 factorial design in triplicate at N fertilizer rates of 0, 1475, 1967 kg N ha^{-1} and biochar rates of 0, 20, and 40 t ha^{-1}. Although CH_4 emissions were not obviously affected by N fertilization, N_2O emissions increased by 27.2–116.2% and the net GWP increased by 30.6–307.2%. Consequently, the GHGI increased significantly, but vegetable yield and the NEEB did not improve. Furthermore, biochar amendments did not significantly influence CH_4 emissions, but significantly decreased the N_2O emissions by 1.7–25.4%, the net GWP by 89.6–700.5%, and the GHGI by 89.5–644.8%. In addition, vegetable yields significantly increased by 2.1–74.1%, which improved the NEEB. Thus, N fertilization did not increase vegetable yields or the NEEB. However, N fertilization did increase the net GWP and GHGI. In contrast, biochar additions resulted in lower N_2O emissions and net GWP and GHGI, but increased vegetable yield and the NEEB in the intensive vegetable production system. Therefore, appropriate biochar amendment should be studied to combat changing climate and to improve the economic profits of vegetable production.

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Low uptake affinity cultivars with biochar to tackle Cd-tainted rice — A field study over four rice seasons in Hunan, China

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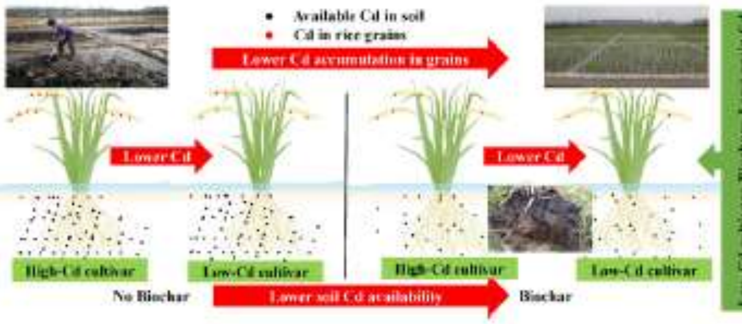
HIGHLIGHTS

- Biochar sustainably reduced soil Cd availability and Cd translocation in rice plant.
- Indica conventional cultivars had lower Cd but higher Zn in grains than hybrid ones.
- Biochar significantly reduced grain Cd and Cd/Zn ratio, though didn't affect Zn.
- Biochar combined with low-Cd cultivar greatly improved the safety of rice.

GRAPHICAL ABSTRACT



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ABSTRACT

Biochar is becoming an environmentally friendly material for remediation of heavy metal contaminated soils and improving food safety. A field trial over four rice seasons was conducted to investigate the use of biochar and low Cd accumulating cultivars on Cd uptake in a heavy metal contaminated soil. Wheat straw derived biochar was applied at 0, 20 and 40 t ha^{-1}. Two rice cultivars with differing Cd accumulation abilities were selected in each season. The results showed that both biochar and low Cd affinity cultivars significantly reduced rice grain Cd accumulation. Biochar had no significant effect the first season but thereafter consistently reduced rice grain Cd by a maximum of 61, 86 and 57% over the next three seasons. Zn accumulation in the rice grains was not decreased by biochar application, although available soil Zn was sharply reduced (35–91%). Indica conventional rice cultivars had much lower Cd, but higher Zn and lower Cd/Zn ratios in the grain than indica hybrid cultivars. Biochar was more effective for mitigating grain Cd accumulation in low Cd affinity cultivars than in high affinity cultivars. Soil pH was sustainably increased (up to nearly 1 unit) while available Cd significantly decreased by a maximum of 85% after biochar addition. The translocation of Cd from rice roots to shoots was reduced from 20 to 80% by biochar. Low uptake affinity cultivars combined with biochar reduced late rice grain Cd concentration and Cd/Zn ratios by 69–80% and 72–80%, respectively. It indicated that the management of combining biochar and low Cd

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Mitigating gaseous nitrogen emissions intensity from a Chinese rice cropping system through an improved management practice aimed to close the yield gap

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ABSTRACT

A major challenge in cereal production is achieving the dual goal of closing yield gaps without further undermining environmental benefits by increasing gaseous nitrogen (N) emissions. To address this challenge, we conducted a two-rotation field experiment with four different management practices in the Taihu Lake region to gain insight into crop yields, N use efficiency (NUE), and the emission fluxes of nitrous oxide (N_2O), nitric oxide (NO), and ammonia (NH_3) from the rice cropping system. The four practices were a control (CK, local practice with zero N-fertilizer), the current traditional practice (CT, local practice with farmers' N management), an improved practice (IP, which closed the yield gap with a reduced N dose of 25%), and a high-yield practice (HY, which maximized the attainable yield with more nutrient inputs). The HY attained the yield potential that was higher by 40% than current yield from the CT. The IP closed the yield gap, achieving 80% of the yield potential, and increased the NUE by 31% and reduced the N surplus by 57% compared with the CT. The lower N surplus of the IP resulted in a decrease in the N_2O and NH_3 emissions intensity (the N_2O or NH_3 emission per unit crop yield) of 40% and 55%, respectively relative to the CT. Low NO emissions concomitant with yield increases incurred the marginal NO emission intensity. Thus, the IP should be a promising strategy to increase yield while simultaneously mitigating the gaseous N emissions intensity. Linear or nonlinear responses of gaseous N emissions (N_2O, NO and NH_3) by N fertilizer to incremental N surplus suggested that reducing the N surplus by both increasing the crop uptake and optimizing N management should be effective in reducing projected gaseous N emissions.

1. Introduction

The Green Revolution helped to create the world's "Miracle in China," with less than 9% of the world's arable land feeding more than 22% of the world's population (Zhang et al., 2011). However, Chinese food success has been at the cost of excessive consumption of resources and ongoing environmental degradation since the 1980s (Tilman et al., 2011). In the past 10–20 years (1996–2011), the agricultural input of chemical fertilizers, such as nitrogen (N) and phosphorus (P), has continued to increase, whereas the rate of gain in cereal yields has slowed markedly and even stagnated in many areas (Grassini et al., 2013; Chen et al., 2014). That large increase in input without a correspondingly large increase in yield further lowered the already-low ratio of grain harvested to fertilizer applied in China. For example, often twice as much fertilizer N is applied than is recovered in crops, which, in turn, results in a nutrient surplus and drives environmental damage mainly by reactive N (Nr) losses (Chen et al., 2011). In the coming decades, Chinese agriculture will face a crucial challenge from multiple pressures stemming from resource exhaustion, environmental pollution and food demand as a result of population growth and an increasing consumption of calorie- and meat-intensive diets.

An effort should be made to ensure food security without further undermining the integrity of the Earth's environmental systems in spite of these pressures. Many studies demonstrate that

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Biochar decreased microbial metabolic quotient and shifted community composition four years after a single incorporation in a slightly acid rice paddy from southwest China

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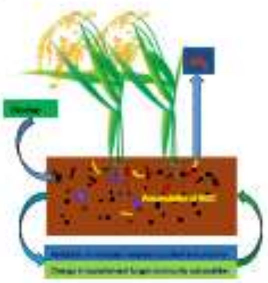
HIGHLIGHTS

- Biochar changed soil properties in a rice paddy four years after incorporation.
- Biochar induced a lower microbial metabolic quotient and enzyme activity.
- Biochar altered both bacterial and fungal community structures.
- Fungal rather than bacterial community composition was more affected by biochar.

GRAPHICAL ABSTRACT



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Microbial community composition
Illumina Miseq sequencing

ABSTRACT

While numerous studies both in laboratory and field have showed short term impacts of biochar on soil microbial community, there have been comparatively few reports addressing its long term impacts particular in field condition. This study investigated the changes of microbial community activity and composition in a rice paddy four years after a single incorporation of biochar at 20 and 40 t/ha. The results indicated that biochar amendment after four years increased soil pH, soil organic C (SOC), total N and C/N ratio and decreased bulk density, particularly for the 40 t/ha treatment compared to the control (0 t/ha). Though no significant difference was observed in soil basal respiration, biochar amendment increased soil microbial biomass C and resulted in a significantly lower metabolic quotient. Besides, dehydrogenase and β-glucosidase activities were significantly decreased under biochar amendment relative to the control. The results of Illumina Miseq sequencing showed that biochar increased α-diversity of bacteria but decreased that of fungi and changed both bacterial and fungal community structures significantly. Biochar did not change the relative abundances of majority of bacteria at phylum level with the exception of a significant reduction of Actinobacteria, but significantly changed most of bacterial groups at genus level, particularly at 40 t/ha. In contrast, biochar significantly decreased the relative abundances of *Ascomycota* and Basidiomycota by 11% and 66% and increased the relative abundances of Zygomycota by 147% at 40 t/ha compared to the non-amended soil. Redundancy analysis (RDA) indicated that biochar induced changes in soil chemical properties, such as pH, SOC and C/N, were important factors driving community composition shifts. This

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ORIGINAL PAPER

Rhizosphere microbial community manipulated by 2 years of consecutive biofertilizer application associated with banana *Fusarium* wilt disease suppression

Zongzhuan Shen · Yunze Ruan · Xue Chao · Jian Zhang · Rong Li · Qirong Shen

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Abstract In our previous work, applying biofertilizer containing *Bacillus amyloliquefaciens* strain NJN-6 to a banana orchard infected by a serious *Fusarium* wilt disease over two consecutive years effectively controlled this soil-borne disease. In this study, deep pyrosequencing of 16S ribosomal RNA (rRNA) genes and internal transcribed spacer (ITS) sequences was performed to investigate how the composition of rhizosphere microbial community responded to the application of biofertilizer (BIO), pig manure compost (PM), and chemical fertilizer (CF) and to explore the potential correlation between the microbial community composition and the *Fusarium* wilt disease. A total of 104,201 bacterial 16S rRNA genes and 154,953 fungal ITS sequence reads were obtained after basic quality control, and *Acidobacteria*, *Actinobacteria*, *Bacteroidetes*, *Firmicutes*, *Proteobacteria*, and *Ascomycota* were the most abundant bacterial and fungal phyla across all samples. Compared with the PM and CF control, the alpha diversity of bacteria significantly ($P<0.05$) increased, whereas the value of the fungi was significantly ($P<0.05$) reduced following two consecutive years of biofertilizer application. Moreover, the abundance of *Acidobacteria* (*Gp1* and *Gp3*), *Firmicutes*, *Leptosphaeria*, and *Phaeosphaeriopsis* was significantly ($P<0.05$) increased, while the abundance of *Proteobacteria* and *Ascomycota* was significantly ($P<0.05$) decreased in the BIO treatment. Furthermore, the abundance of *Fusarium*, a causal pathogen for *Fusarium* wilt disease, was significantly ($P<0.05$) reduced in the BIO treatment compared with the CF control and was slightly reduced (not significant) compared with the PM control. Interestingly, the disease incidence was negatively correlated with the enriched taxa of *Acidobacteria* (*Gp1* and *Gp3*) and *Firmicutes*, *Leptosphaeria*, and *Phaeosphaeriopsis* but positively correlated with abundance of *Proteobacteria*, *Ascomycota*, *Fusarium*, *Cylindrocarpon*, *Gymnascella*, *Monographella*, *Pochonia*, and *Sakaguchia* taxa. The results from this study suggest that 2 years of biofertilizer application manipulated the composition of rhizosphere microbial community and induced the *Fusarium* suppression by increasing bacterial diversity and potentially stimulating microbial consortia taxa, such as *Acidobacteria* (*Gp1* and *Gp3*), *Firmicutes*, *Leptosphaeria*, and *Phaeosphaeriopsis*.

Keywords Banana · Rhizosphere · Pyrosequencing · Microbial ecology · *Fusarium* wilt disease · Biofertilizer

Z. Shen and Y. Ruan contributed equally to this article.

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Introduction

The *Cavendish* banana cultivar is the most widely planted and important cash crop in South China, but the growth of this cultivar is now negatively affected by *Fusarium* wilt disease because of the invasion of the fungus *Fusarium oxysporum* f. sp. *cubense* race four (Pegg et al. 1996; Xu et al. 2011). This *Fusarium* wilt disease is reported to be the greatest threat to

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A 2-yr field assessment of the effects of chemical and biological nitrification inhibitors on nitrous oxide emissions and nitrogen use efficiency in an intensively managed vegetable cropping system

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ABSTRACT

The application of nitrification inhibitors (NIs) is effective in suppressing nitrification and N_2O emissions while promoting crop yields in many agroecosystems. However, the inhibitory effects of different NIs for vegetable production under soil and environmental conditions in China are not fully understood. To evaluate the effects of chemical and biological NIs on N_2O emissions and the nitrogen use efficiency (NUE), a 2-yr field experiment with four treatments (regular urea (Urea), urea + dicyandiamide (DCD), urea + nitrapyrin (CP) and urea + biological nitrification inhibitor (BNI)) performed in triplicate was carried out in an intensive vegetable field using the static chamber and gas chromatography method. The results showed that the CP and BNI treatments shifted the main form of soil inorganic nitrogen (N) from nitrate (NO_3^-), which was the case for the Urea and DCD treatments, to ammonium (NH_4^+). The variations in soil temperature, moisture and NO_3^- content regulated the seasonal fluctuations of N_2O emissions. Moreover, the DCD treatment did not significantly affect N_2O or agronomic NUE relative to the Urea treatment, while CP and BNI significantly decreased annual N_2O emissions by 16.5% and 18.1% and improved NUE by 12.6% and 6.7%, respectively. Thus, a markedly lower global warming potential (GWP) and greenhouse gas intensity (GHGI) was observed in the CP and BNI treatments relative to the Urea and DCD treatments. The results demonstrated that the NIs played important roles in enhancing yields and reducing N_2O emissions from the vegetable ecosystem and that the CP and BNI treatments are suitable for marketing in China.

1. Introduction

N is an essential nutrient for plant growth and health, and it is often the growth-limiting factor in agricultural systems (Zhu and Chen, 2002). Agricultural intensification has led to high inputs of N fertilizer into cultivated land (Qu et al., 2014). Further increases in fertilization rates are unlikely to be effective at increasing crop yields, as the use efficiency of N fertilizer sharply declines at higher application rates, and attention related to N fertilizer application has shifted from its role in promoting crop production to environmental pollution (Tilman et al., 2002). Nitrification, a key process in the global N cycle that generates NO_3^- through microbial activity, may result in the transformation of relatively immobile NH_4^+ to highly mobile NO_3^-, making inorganic N susceptible to losses through leaching of NO_3^- and/or gaseous N emissions, potentially initiating a cascade of environmental and health problems (Galloway et al., 2008; Schlesinger, 2009). Soil microbial processes produce gases such as nitrous oxide (N_2O) and methane (CH_4), and these processes play an important role because of their global warming potential (GWP) (IPCC, 2013). Globally, agriculture accounts for 52% and 84% of anthropogenic CH_4 and N_2O emissions (Smith et al., 2008), totaling 7.7 Pg CO_2 equiv. yr^{-1} (Robertson and Grace, 2004).

The low NUE observed in many agricultural systems is also largely the result of N losses associated with nitrification (i.e., N losses from NO_3^- leaching and denitrification) (Cui et al., 2010; Linquist et al., 2013). China accounts for 45% of the world's total vegetable production, which occupies 11.6% of all cultivated land in China (FAOSTAT, 2009). Intensive N fertilizer application has become the norm for vegetable production systems in China because of its relationship to plant productivity and farm profitability (Xiong et al., 2006; Mei et al., 2011; Wang et al., 2001). Fertilizer is lost to aquatic systems through nitrate leaching and the atmosphere via ammonia volatilization and N_2O emissions

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Biochar stability in soil: meta-analysis of decomposition and priming effects

By: Wang, JY (Wang, Jinyang)[1,2]; Xiong, ZQ (Xiong, Zhengqin)[2]; Kuzyakov, Y (Kuzyakov, Yakov)[1,3]

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GLOBAL CHANGE BIOLOGY BIOENERGY

Volume: 8 **Issue:** 3 **Pages:** 512-523

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Document Type: Review

View Journal Impact

Abstract

The stability and decomposition of biochar are fundamental to understand its persistence in soil, its contribution to carbon (C) sequestration, and thus its role in the global C cycle. Our current knowledge about the degradability of biochar, however, is limited. Using 128 observations of biochar-derived CO2 from 24 studies with stable (C-13) and radioactive (C-14) carbon isotopes, we meta-analyzed the biochar decomposition in soil and estimated its mean residence time (MRT). The decomposed amount of biochar increased logarithmically with experimental duration, and the decomposition rate decreased with time. The biochar decomposition rate varied significantly with experimental duration, feedstock, pyrolysis temperature, and soil clay content. The MRTs of labile and recalcitrant biochar C pools were estimated to be about 108days and 556years with pool sizes of 3% and 97%, respectively. These results show that only a small part of biochar is bioavailable and that the remaining 97% contribute directly to long-term C sequestration in soil. The second database (116 observations from 21 studies) was used to evaluate the priming effects after biochar addition. Biochar slightly retarded the mineralization of soil organic matter (SOM; overall mean: -3.8%, 95% CI=-8.1-0.8%) compared to the soil without biochar addition. Significant negative priming was common for studies with a duration shorter than half a year (-8.6%), crop-derived biochar (-20.3%), fast pyrolysis (-18.9%), the lowest pyrolysis temperature (-18.5%),

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Response of soil carbon dioxide fluxes, soil organic carbon and microbial biomass carbon to biochar amendment: a meta-analysis

By: Liu, SW (Liu, Shuwei)[1,2]; Zhang, YJ (Zhang, Yaojun)[1,2]; Zong, YJ (Zong, Yajie)[1,2]; Hu, ZQ (Hu, Zhiqiang)[1,2]; Wu, S (Wu, Shuang)[1,2]; Zhou, J (Zhou, Jie)[1,2]; Jin, YG (Jin, Yaguo)[1,2]; Zou, JW (Zou, Jianwen)[1,2]

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GLOBAL CHANGE BIOLOGY BIOENERGY

Volume: 8 **Issue:** 2 **Pages:** 392-406

DOI: 10.1111/gcbb.12265

Published: MAR 2016

Document Type: Article

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Abstract

Biochar as a carbon-rich coproduct of pyrolyzing biomass, its amendment has been advocated as a potential strategy to soil carbon (C) sequestration. Updated data derived from 50 papers with 395 paired observations were reviewed using meta-analysis procedures to examine responses of soil carbon dioxide (CO2) fluxes, soil organic C (SOC), and soil microbial biomass C (MBC) contents to biochar amendment. When averaged across all studies, biochar amendment had no significant effect on soil CO2 fluxes, but it significantly enhanced SOC content by 40% and MBC content by 18%. A positive response of soil CO2 fluxes to biochar amendment was found in rice paddies, laboratory incubation studies, soils without vegetation, and unfertilized soils. Biochar amendment significantly increased soil MBC content in field studies, N-fertilized soils, and soils with vegetation. Enhancement of SOC content following biochar amendment was the greatest in rice paddies among different land-use types. Responses of soil CO2 fluxes and MBC to biochar amendment varied

Effects of organic-inorganic compound fertilizer with reduced chemical fertilizer application on crop yields, soil biological activity and bacterial community structure in a rice-wheat cropping system

By: Zhao, J (Zhao, Jun)[1,2,3,4]; Ni, T (Ni, Tian)[1,2,3,4]; Li, J (Li, Jing)[1,2,3,4]; Lu, Q (Lu, Qiang)[1,2,3,4]; Fang, ZY (Fang, Zhiying)[1,2,3,4]; Huang, QW (Huang, Qiwei)[1,2,3,4]; Zhang, RF (Zhang, Ruifu)[5]; Li, R (Li, Rong)[1,2,3,4]; Shen, B (Shen, Biao)[1,2,3,4]; Shen, QR (Shen, Qirong)[1,2,3,4]

APPLIED SOIL ECOLOGY
Volume: 99 **Pages:** 1-12
DOI: 10.1016/j.apsoil.2015.11.006
Published: MAR 2016
Document Type: Article
View Journal Impact

Abstract

The development of more stable and sustainable agroecosystems for improving food production has caused wide public concern in recent years. In the present study, we conducted a field experiment to investigate the effect of pig manure organic-inorganic compound fertilizer with reduced chemical fertilizer on the crop yields, soil physicochemical properties, biological activities and bacterial community structure in a rice-wheat cropping system over two crop seasons (rice and wheat). The results showed that at all sampling times, this fertilizer regime enhanced the soil nutrient availability, microbial biomass, enzymatic activities, and soil nitrogen processes and, to some extent, promoted crop yields. Across all soil samples, bacterial communities were dominated by Proteobacteria, Acidobacteria, and Chloroflexi at the phylum level. Hierarchical cluster analysis based on the weighted UniFrac distance revealed that the bacterial community structures were strongly separated by the sampling time, and the treatments in the wheat harvest soils. A Venn

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Consistent increase in abundance and diversity but variable change in community composition of bacteria in topsoil of rice paddy under short term biochar treatment across three sites from South China

By: Chen, JH (Chen, Junhui)[1,2]; Liu, XY (Liu, Xiaoyu)[2]; Li, LQ (Li, Lianqing)[2]; Zheng, JW (Zheng, Jinwei)[2]; Qu, JJ (Qu, Jingjing)[2]; Zheng, JF (Zheng, Jufeng)[2]; Zhang, XH (Zhang, Xuhui)[2]; Pan, GX (Pan, Genxing)[2]
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APPLIED SOIL ECOLOGY
Volume: 91 **Pages:** 68-79
DOI: 10.1016/j.apsoil.2015.02.012
Published: JUL 2015
Document Type: Article
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Abstract

Biochar functionality related to soil microbial community changes has not yet been fully understood. In this study, we present a cross site field experiment on bacterial community changes of rice paddies among three sites (Jiangxi province, JX; Hunan province, HN; and Sichuan province, SC) from South China with biochar amended (BSA) at 0, 20 and 40 t ha(-1) before rice plantation in 2010. Changes in bacterial abundance and diversity of topsoil (0-15 cm) sampled at rice harvest were assessed. Increases in soil pH, soil organic carbon, total N, soil microbial biomass, as well as bacterial gene copy numbers and diversity indices (phylogenetic diversity, Shannon, Chao1 and OTU richness) were consistently observed under BSA at 40 t ha(-1), though generally insignificant at 20 t ha(-1) across the sites. Cluster analysis of both terminal restriction fragment length polymorphism (T-RFLP) profiles and pyrosequencing

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Carbon footprint of grain crop production in China - based on farm survey data

By: Yan, M (Yan, Ming)[1]; Cheng, K (Cheng, Kun)[1]; Luo, T (Luo, Ting)[1]; Yan, Y (Yan, Yu)[1]; Pan, GX (Pan, Genxing)[1,2,3]; Rees, RM (Rees, Robert M.)[3]

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JOURNAL OF CLEANER PRODUCTION

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DOI: 10.1016/j.jclepro.2015.05.058

Published: OCT 1 2015

Document Type: Article

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Abstract

Quantifying the carbon footprint of crop production can help identify key options to mitigate greenhouse gas emissions from agriculture. Using farm survey data from eastern China, the carbon footprints of three major grain crops (rice, wheat and maize) were assessed by quantifying the greenhouse gas emissions from individual inputs and farming operations with a full life cycle assessment methodology. The farm carbon footprint in terms of farm area was estimated to be 6.0 +/- 0.1, 3.0 +/- 0.2, and 2.3 +/- 0.1 t CO2-eq ha(-1), and the product carbon footprint in terms of grain produced was 0.80 +/- 0.02, 0.66 +/- 0.03, and 0.33 +/- 0.02 t CO2-eq t(-1) grain for rice, wheat and maize, respectively. Use of synthetic nitrogen fertilizers contributed 44-79% and mechanical operations 8-15%, of the total carbon footprints. Irrigation and direct methane emission made a significant contribution by 19% and by 25%, on average respectively for rice production. However, irrigation was only responsible for 2-3% of the total carbon footprints in wheat and maize. The carbon footprints of wheat and maize production varied among climate regions, and this was explained largely by the differences in inputs of nitrogen fertilizers and mechanical operations to support crop management. Moreover, a significant decrease (22-28%) in the product carbon footprint both of wheat and maize was found in large sized farms, compared to smaller ones. This study demonstrated that carbon footprint of crop production could be affected by farm size

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Combined effects of nitrogen fertilization and biochar on the net global warming potential, greenhouse gas intensity and net ecosystem economic budget in intensive vegetable agriculture in southeastern China

By: Li, B (Li, B.)[1]; Fan, CH (Fan, C. H.)[1]; Zhang, H (Zhang, H.)[1]; Chen, ZZ (Chen, Z. Z.)[1]; Sun, LY (Sun, L. Y.)[1]; Xiong, ZQ (Xiong, Z. Q.)[1]

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ATMOSPHERIC ENVIRONMENT

Volume: 100 **Pages:** 10-19

DOI: 10.1016/j.atmosenv.2014.10.034

Published: JAN 2015

Document Type: Article

View Journal Impact

Abstract

Field experiments were conducted to determine the effects of nitrogen (N) fertilization and biochar addition on the net global warming potential (net GWP), greenhouse gas intensity (GHGI) and net ecosystem economic budget (NEEB). These experiments were conducted in an intensive vegetable field with 4 consecutive vegetable crops in 2012 and 2013 in southeastern China. The experiment was conducted with a 3(2) factorial design in triplicate at N fertilizer rates of 0, 1475, 1967 kg N ha(-1) and biochar rates of 0, 20, and 40 t ha(-1). Although CH4 emissions were not obviously affected by N fertilization, N2O emissions increased by 27.2-116.2% and the net GWP increased by 30.6-307.2%. Consequently, the GHGI increased significantly, but vegetable yield and the NEEB did not improve. Furthermore, biochar amendments did not significantly influence CH4 emissions, but significantly decreased the N2O emissions by 1.7-25.4%, the net GWP by 89.6-700.5%, and the GHGI by 89.5-644.8%. In addition, vegetable yields significantly increased by 2.1-74.1%, which improved the

Low uptake affinity cultivars with biochar to tackle Cd-tainted rice - A field study over four rice seasons in Hunan, China

By: Chen, D (Chen, De)[1,2]; Guo, H (Guo, Hu)[1,2]; Li, RY (Li, Ruiyue)[1,2]; Li, LQ (Li, Lianqing)[1,2]; Pan, GX (Pan, Genxing)[1,2]; Chang, A (Chang, Andrew)[3]; Joseph, S (Joseph, Stephen)[1,2,4]
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SCIENCE OF THE TOTAL ENVIRONMENT
Volume: 541 **Pages:** 1489-1498
DOI: 10.1016/j.scitotenv.2015.10.052
Published: JAN 15 2016
Document Type: Article
View Journal Impact

Abstract
Biochar is becoming an environmentally friendly material for remediation of heavy metal contaminated soils and improving food safety. A field trial over four rice seasons was conducted to investigate the use of biochar and low Cd accumulating cultivars on Cd uptake in a heavy metal contaminated soil. Wheat straw derived biochar was applied at 0, 20 and 40 t ha(-1). Two rice cultivars with differing Cd accumulation abilities were selected in each season. The results showed that both biochar and low Cd affinity cultivars significantly reduced rice grain Cd accumulation. Biochar had no significant effect the first season but thereafter consistently reduced rice grain Cd by a maximum of 61, 86 and 57% over the next three seasons. Zn accumulation in the rice grains was not decreased by biochar application, although available soil Zn was sharply reduced (35-91%). Indica conventional rice cultivars had much lower Cd, but higher Zn and lower Cd/Zn ratios in the grain than indica hybrid cultivars. Biochar was more effective for mitigating grain Cd accumulation in low Cd

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Mitigating gaseous nitrogen emissions intensity from a Chinese rice cropping system through an improved management practice aimed to close the yield gap

By: Zhao, M (Zhao, Miao)[1,2]; Tian, YH (Tian, Yuhua)[1]; Ma, YC (Ma, Yuchun)[3]; Zhang, M (Zhang, Min)[1]; Yao, YL (Yao, Yuanlin)[1]; Xiong, ZQ (Xiong, Zhengqin)[4]; Yin, B (Yin, Bin)[1]; Zhu, ZL (Zhu, Zhaoliang)[1]

AGRICULTURE ECOSYSTEMS & ENVIRONMENT
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Published: MAY 1 2015
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View Journal Impact

Abstract

A major challenge in cereal production is achieving the dual goal of closing yield gaps without further undermining environmental benefits by increasing gaseous nitrogen (N) emissions. To address this challenge, we conducted a two-rotation field experiment with four different management practices in the Taihu Lake region to gain insight into crop yields, N use efficiency (NUE), and the emission fluxes of nitrous oxide (N2O), nitric oxide (NO), and ammonia (NH3) from the rice cropping system. The four practices were a control (CK, local practice with zero N-fertilizer), the current traditional practice (CT, local practice with farmers' N management), an improved practice (IP, which closed the yield gap with a reduced N dose of 25%), and a high-yield practice (HY, which maximized the attainable yield with more nutrient inputs). The HY attained the yield potential that was higher by 40% than current yield from the CT. The IP closed the yield gap, achieving 80% of the yield potential, and increased the NUE by 31% and reduced the N surplus by 57% compared with the CT. The lower N surplus of the IP resulted in a decrease in the N2O and NH3 emissions intensity (the N2O or NH3 emission per unit crop yield) of 40% and 65%,

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Biochar decreased microbial metabolic quotient and shifted community composition four years after a single incorporation in a slightly acid rice paddy from southwest China

By: Zheng, JF (Zheng, Jufeng)[1,2]; Chen, JH (Chen, Junhui)[1,3]; Pan, GX (Pan, Genxing)[1,2]; Liu, XY (Liu, Xiaoyu)[1,2]; Zhang, XH (Zhang, Xuhui)[1,2]; Li, LQ (Li, Lianqing)[1,2]; Sian, RJ (Sian, Rongjun)[1,2]; Cheng, K (Cheng, Kun)[1,2]; JinweiZheng (JinweiZheng)[1,2]

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SCIENCE OF THE TOTAL ENVIRONMENT

Volume: 571 **Pages:** 206-217

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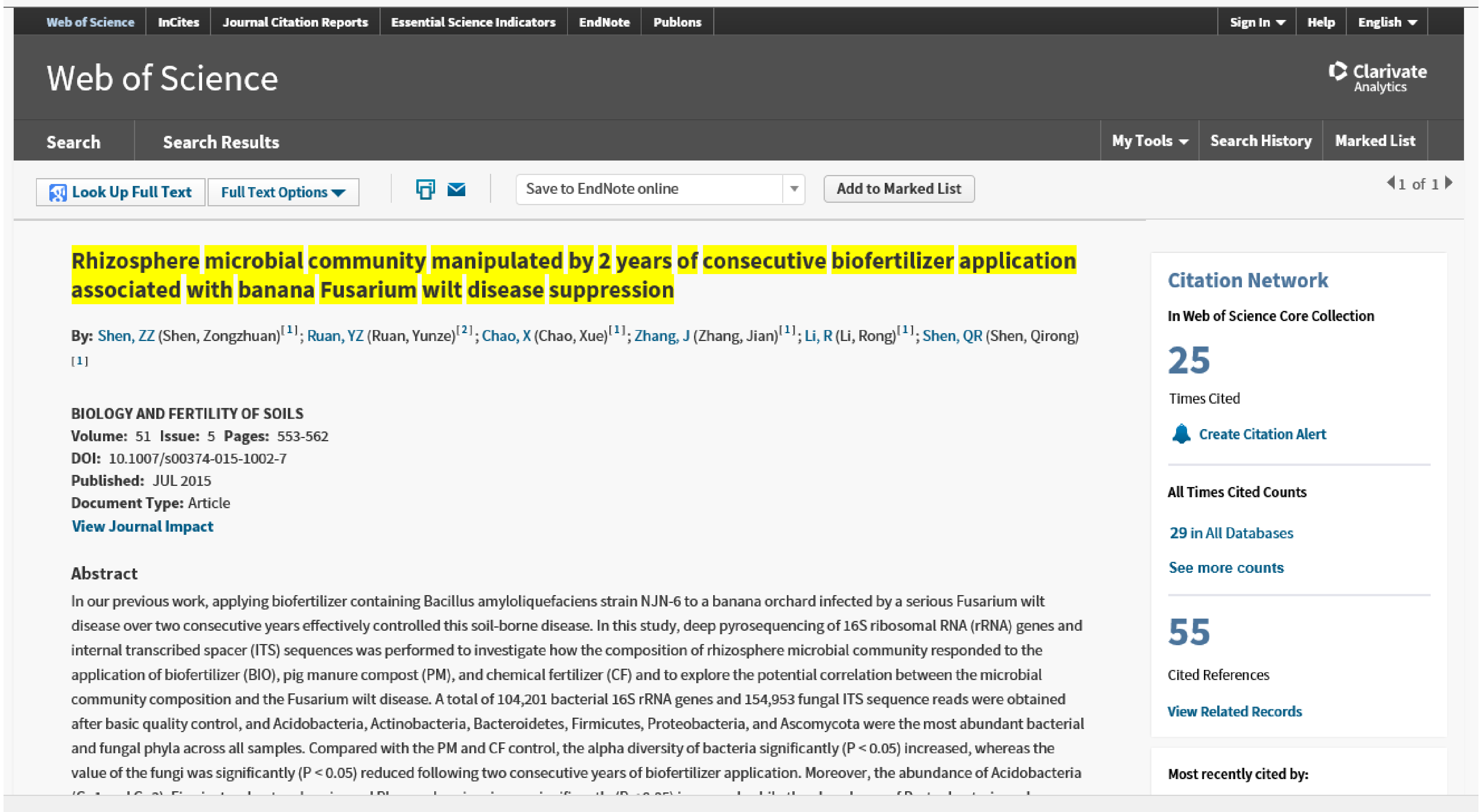
Abstract

While numerous studies both in laboratory and field have showed short term impacts of biochar on soil microbial community, there have been comparatively few reports addressing its long term impacts particular in field condition. This study investigated the changes of microbial community activity and composition in a rice paddy four years after a single incorporation of biochar at 20 and 40 t/ha. The results indicated that biochar amendment after four years increased soil pH, soil organic C (SOC), total N and C/N ratio and decreased bulk density, particularly for the 40 t/ha treatment compared to the control (0 t/ha). Though no significant difference was observed in soil basal respiration, biochar amendment increased soil microbial biomass C and resulted in a significantly lower metabolic quotient. Besides, dehydrogenase and beta-glucosidase activities were significantly decreased under biochar amendment relative to the control. The results of Illumina Miseq sequencing showed that biochar increased alpha-diversity of bacteria but decreased that of



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Rhizosphere microbial community manipulated by 2 years of consecutive biofertilizer application associated with banana Fusarium wilt disease suppression

By: Shen, ZZ (Shen, Zongzhuan)[1]; Ruan, YZ (Ruan, Yunze)[2]; Chao, X (Chao, Xue)[1]; Zhang, J (Zhang, Jian)[1]; Li, R (Li, Rong)[1]; Shen, QR (Shen, Qirong)[1]

BIOLOGY AND FERTILITY OF SOILS
Volume: 51 **Issue:** 5 **Pages:** 553-562
DOI: 10.1007/s00374-015-1002-7
Published: JUL 2015
Document Type: Article
View Journal Impact

Abstract

In our previous work, applying biofertilizer containing Bacillus amyloliquefaciens strain NJN-6 to a banana orchard infected by a serious Fusarium wilt disease over two consecutive years effectively controlled this soil-borne disease. In this study, deep pyrosequencing of 16S ribosomal RNA (rRNA) genes and internal transcribed spacer (ITS) sequences was performed to investigate how the composition of rhizosphere microbial community responded to the application of biofertilizer (BIO), pig manure compost (PM), and chemical fertilizer (CF) and to explore the potential correlation between the microbial community composition and the Fusarium wilt disease. A total of 104,201 bacterial 16S rRNA genes and 154,953 fungal ITS sequence reads were obtained after basic quality control, and Acidobacteria, Actinobacteria, Bacteroidetes, Firmicutes, Proteobacteria, and Ascomycota were the most abundant bacterial and fungal phyla across all samples. Compared with the PM and CF control, the alpha diversity of bacteria significantly ($P < 0.05$) increased, whereas the value of the fungi was significantly ($P < 0.05$) reduced following two consecutive years of biofertilizer application. Moreover, the abundance of Acidobacteria

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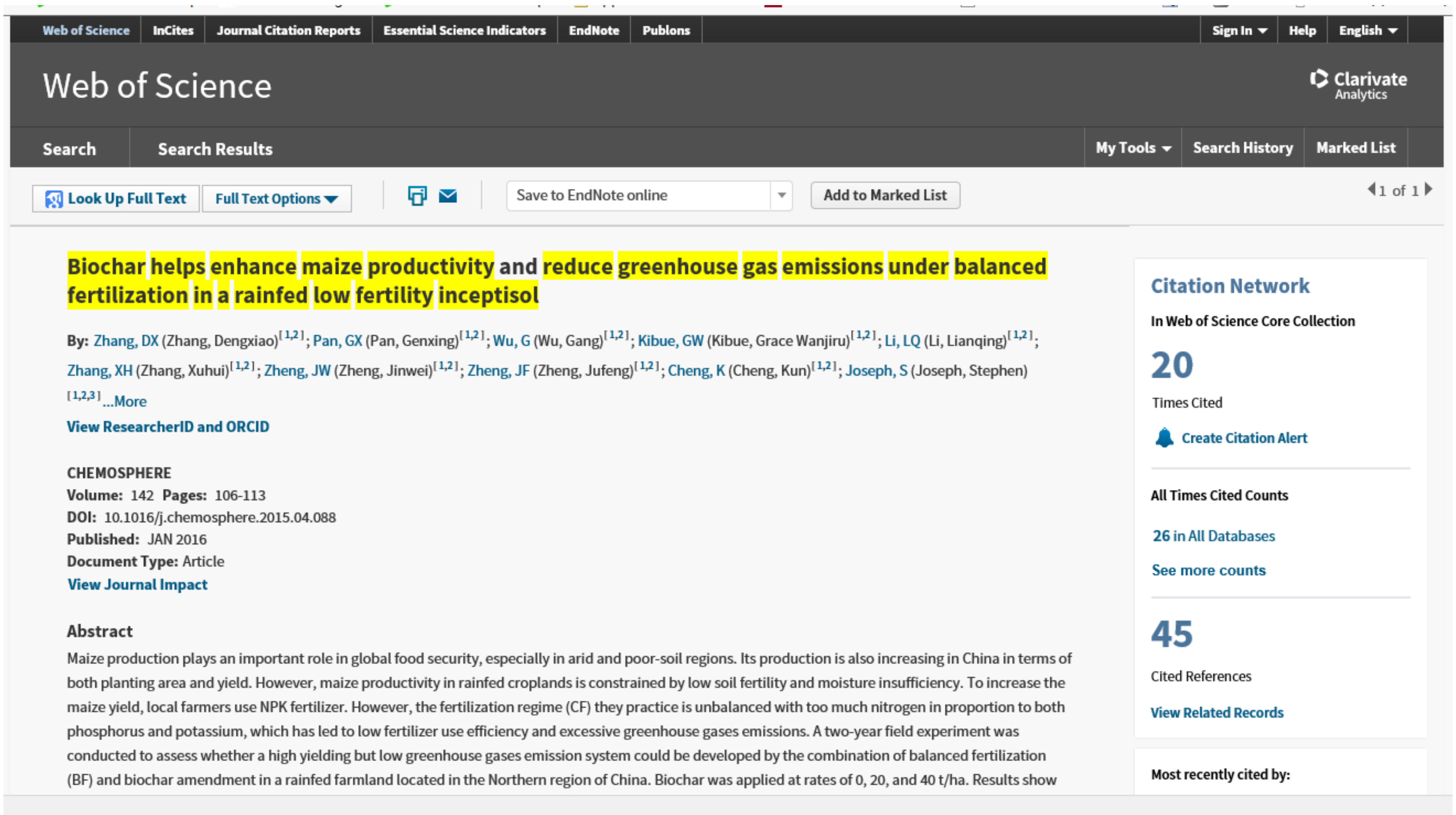

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Biochar helps enhance maize productivity and reduce greenhouse gas emissions under balanced fertilization in a rainfed low fertility inceptisol

By: Zhang, DX (Zhang, Dengxiao)[1,2]; Pan, GX (Pan, Genxing)[1,2]; Wu, G (Wu, Gang)[1,2]; Kibue, GW (Kibue, Grace Wanjiru)[1,2]; Li, LQ (Li, Lianqing)[1,2]; Zhang, XH (Zhang, Xuhui)[1,2]; Zheng, JW (Zheng, Jinwei)[1,2]; Zheng, JF (Zheng, Jufeng)[1,2]; Cheng, K (Cheng, Kun)[1,2]; Joseph, S (Joseph, Stephen) [1,2,3] ...More

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CHEMOSPHERE
Volume: 142 **Pages:** 106-113
DOI: 10.1016/j.chemosphere.2015.04.088
Published: JAN 2016
Document Type: Article
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Abstract

Maize production plays an important role in global food security, especially in arid and poor-soil regions. Its production is also increasing in China in terms of both planting area and yield. However, maize productivity in rainfed croplands is constrained by low soil fertility and moisture insufficiency. To increase the maize yield, local farmers use NPK fertilizer. However, the fertilization regime (CF) they practice is unbalanced with too much nitrogen in proportion to both phosphorus and potassium, which has led to low fertilizer use efficiency and excessive greenhouse gases emissions. A two-year field experiment was conducted to assess whether a high yielding but low greenhouse gases emission system could be developed by the combination of balanced fertilization (BF) and biochar amendment in a rainfed farmland located in the Northern region of China. Biochar was applied at rates of 0, 20, and 40 t/ha. Results show

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A 2-yr field assessment of the effects of chemical and biological nitrification inhibitors on nitrous oxide emissions and nitrogen use efficiency in an intensively managed vegetable cropping system

By: Zhang, M (Zhang, M.)[1]; Fan, CH (Fan, C. H.)[1]; Li, QL (Li, Q. L.)[1]; Li, B (Li, B.)[1]; Zhu, YY (Zhu, Y. Y.)[1]; Xiong, ZQ (Xiong, Z. Q.)[1]

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Abstract

The application of nitrification inhibitors (NIs) is effective in suppressing nitrification and N2O emissions while promoting crop yields in many agroecosystems. However, the inhibitory effects of different NIs for vegetable production under soil and environmental conditions in China are not fully understood. To evaluate the effects of chemical and biological NIs on N2O emissions and the nitrogen use efficiency (NUE), a 2-yr field experiment with four treatments (regular urea (Urea), urea + dicyandiamide (DCD), urea + nitrapyrin (CP) and urea + biological nitrification inhibitor (BNI)) performed in triplicate was carried out in an intensive vegetable field using the static chamber and gas chromatography method. The results showed that the CP and BNI treatments shifted the main form of soil inorganic nitrogen (N) from nitrate (NO3-), which was the case for the Urea and DCD treatments, to ammonium (NH4+). The variations in soil temperature, moisture and NO3- content regulated the seasonal fluctuations of N2O emissions. Moreover, the DCD treatment did not significantly affect N2O or agronomic NUE relative to the Urea treatment, while CP and BNI significantly decreased annual N2O emissions by 16.5% and 18.1% and improved NUE by 12.6% and 6.7%, respectively. Thus, a markedly lower global warming potential (GWP) and greenhouse gas intensity (GHGI) was observed in the CP and BNI treatments relative to the Urea and DCD treatments. The results demonstrated that the NIs played important roles in

证　书

潘剑君 同志：

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INTERGOVERNMENTAL PANEL ON climate change

2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands

Methodological Guidance on Lands with Wet and Drained Soils, and Constructed Wetlands for Wastewater Treatment

Edited by
Takahiko Hiraishi, Thelma Krug, Kiyoto Tanabe, Nalin Srivastava,
Baasansuren Jamsranjav, Maya Fukuda and Tiffany Troxler

Task Force on National Greenhouse Gas Inventories

WMO UNEP

A report prepared by the Task Force on National Greenhouse Gas Inventories of the IPCC and accepted by the Panel but not approved in detail.

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Chapter 3: Rewetted Organic Soils

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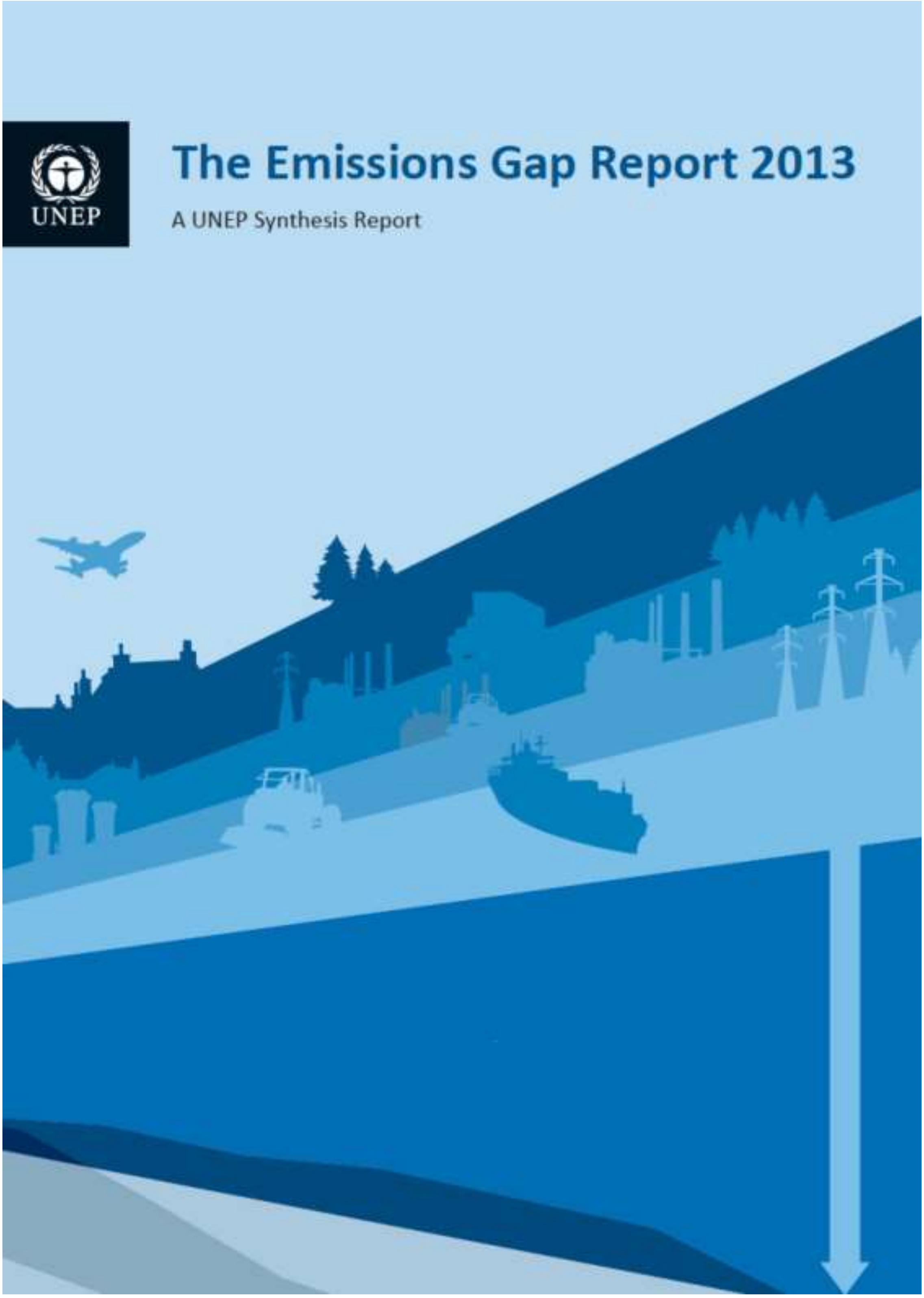
UNEP
The Emissions Gap Report 2013
A UNEP Synthesis Report

Chapter 4

Bridging the gap I: Policies for reducing emissions from agriculture

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4.1 Introduction

Bridging the emissions gap requires a substantial increase in ambition and action, as the previous chapters of this report have illustrated. In 2012, the UNEP Emissions Gap Report (UNEP, 2012) reviewed a number of policies in three sectors – building, transport and forestry – that are proving successful in substantially reducing emissions. In this report we review best-practice policies in agriculture, an often-overlooked emissions-producing sector. The sum of the policies from these different sectors, if replicated and scaled up, shows great potential for narrowing the emissions gap. Moreover, in many cases, these policies can help fulfil important national development objectives beyond climate goals as they can, depending on the policy, boost agricultural productivity, save costs of heating homes, promote eco-tourism, reduce traffic congestion, abate air pollution and associated adverse health effects, or a combination of these.

Here we focus on agriculture because it is among the sectors most affected by climate change, while, at the same time, contributing a significant fraction of the world's greenhouse gas emissions (IPCC, 2007a). Tubiello *et al.* (2013) recently estimated that in 2010 direct emissions from agriculture contributed to 10–12 percent of global greenhouse gas emissions, releasing 5.4–5.8 $GtCO_2e$ into the atmosphere. UNEP (2012) gave a best estimate of 11 percent.

According to Bellarby *et al.* (2008) 38 percent of the emissions can be attributed to nitrous oxide from soils, 32 percent to methane from enteric fermentation in ruminant livestock, 12 percent to biomass burning, 11 percent to rice production and 7 percent to manure management. Direct agricultural emissions, as opposed to indirect ones discussed below, account for 60 percent of global nitrous oxide emissions and 50 percent of global methane emissions (Smith *et al.*, 2008).

Globally, 80 percent of deforestation and forest degradation is believed to be related to agriculture (Kissinger *et al.*, 2012). A more realistic evaluation of emissions related to agriculture should therefore include the emissions released by the conversion of forests and grasslands into agricultural land and the degradation of peat lands. These emissions can be described as indirect emissions from agriculture and, according to Vermeulen *et al.* (2012), amounted to 2.2–6.6 $GtCO_2e$ in 2008. If agricultural pre- and post-production emissions are also added, the global food system accounts for about 19–29 percent of global greenhouse gas emissions (Vermeulen *et al.*, 2012)[1].

Between 1990 and 2005, direct agricultural emissions rose by around 0.6 $GtCO_2e$ per year (IPCC, 2007b), reflecting trends in major drivers such as population growth and rising affluence. These trends are expected to continue although their trajectories largely depend on our choices in natural resource management, food systems and consumer behaviour. Scenarios of continued population growth and consumption suggest that, by 2055, global agricultural methane and nitrous oxide emissions might increase by 57 percent and 71 percent, respectively (Popp *et al.*, 2010).

Although current trends predict strong growth of agricultural greenhouse gas emissions, there is significant potential to reduce them in the coming decades, particularly if mitigation options are mainstreamed into agricultural policies and incentives. At marginal costs of less than US $50–100 per tonne of carbon-dioxide equivalent, the direct emission reduction potential of agriculture lies in the range of 1.1–4.3 $GtCO_2e$ per year in 2020 (Chapter 6). About 89 percent of this potential could be realized through improved management practices such as conservation tillage, combined organic/inorganic fertilizer application, adding biochar to the soil, improved water management and reducing flooding and fertilizer use in rice paddies (Smith *et al.*, 2008). Emissions could be further reduced by abating emissions in the broader food sector, for example, by reducing food waste and meat consumption.

[1] Emissions originate from the global food system during pre-production (fertilizer manufacture, energy use in animal-feed and pesticide production); during production (direct and indirect emissions from producing crops and livestock); and during post-production (primary and secondary food processing, food storage, packaging and transport, food refrigeration, retail of food products, catering and domestic food management, and the disposal of food waste).

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中国热点论文榜

中国科学院文献情报中心科学计量团队

"热点论文"在科学界已经是耳熟能详的名词。顾名思义，热点论文即为众人所关注的论文。这种关注度在科学计量学领域可以用论文被引用的次数来量化和测度。我们以2012－2016年中国科学家的SCI论文为数据基础，分领域统计了自发表以来被引频次最高的论文，以展现颇具显示度的中国科技成果。本期发布的热点论文榜涉及数学、物理学、化学、生物学、医学、农学、地学、环境科学和工程技术9个领域。

表1 中国数学领域热点论文(2012－2016年)

序号	论文题目	作者机构	是否合作	被引频次
1	Yuan Xiaoming*等. On the O (1/N) Convergence Rate of the Douglas-Rachford Alternating Direction Method. SIAM Journal on Numerical Analysis, 2012, 50(2): 700-709.	香港浸会大学†	-	177
2	Wang Zhigang*等. Some Basic Properties of Certain Subclasses of Meromorphically Starlike Functions. Journal of Inequalities and Applications, 2014, 29(1)1-13.	安阳师范学院†	是	156
3	Tao Youshan等. Boundedness in a Quasilinear Parabolic-Parabolic Keller-Segel System with Subcritical Sensitivity. Journal of Differential Equations, 2012, 252(1): 692-715.	东华大学	是	149
4	Li Fuyi*等. Existence of a Positive Solution to Kirchhoff Type Problems without Compactness Conditions. Journal of Differential Equations, 2012, 253(7): 2285-2294.	山西大学†	是	126
5	Gao Weifeng*等. A Global Best Artificial Bee Colony Algorithm for Global Optimization. Journal of Computational and Applied Mathematics, 2012, 236(11): 2741-2753.	西安电子科技大学†	-	122
6	Zhu Zuonong等. Solving the (3+1)-Dimensional Generalized KP and BKP Equations by the Multiple Exp-Function Algorithm. Applied Mathematics and Computation, 2012, 218(24): 11871-11879.	上海交通大学	是	120
7	He Xiaoming*等. Existence and Concentration Behavior of Positive Solutions for a Kirchhoff Equation in R-3. Journal of Differential Equations, 2012, 252(2): 1813-1834.	中央民族大学†	-	117
8	Wang Jun*等. Multiplicity and Concentration of Positive Solutions for a Kirchhoff Type Problem with Critical Growth. Journal of Differential Equations, 2012, 253(7): 2314-2351.	江苏大学†	-	114
9	Zhang Ziheng*等. Periodic Solutions for a Singular Damped Differential Equation. Boundary Value Problems, 2015: 5.	天津工业大学†	-	107
10	Lu Bin*. The First Integral Method for Some Time Fractional Differential Equations. Journal of Mathematical Analysis and Applications, 2012, 395(2): 684-693.	安徽大学†	-	102

表6 中国农学领域热点论文(2012-2016年)

序号	论文题目	作者机构	是否合作	被引频次
1	Li Shengting等. Analyses of Pig Genomes Provide Insight into Porcine Demography and Evolution. Nature, 2012, 491(7424), 393-398.	深圳华大基因研究院	是	431
2	Pan Genxing*等. Effects of Biochar Amendment on Soil Quality, Crop Yield and Greenhouse Gas Emission in a Chinese Rice Paddy: A Field Study of 2 Consecutive Rice Growing Cycles. Field Crops Research, 2012, 127: 153-160.	南京农业大学†	是	147
3	Zhang Fusuo*等. Producing More Grain with Lower Environmental Costs. Nature, 2014, 514(7523): 486-489.	中国农业大学†	是	138
4	Dai J.等. A Review of Earthworm Impact on Soil Function and Ecosystem Services. European Journal of Soil Science, 2013, 64(2): 161-182.	华南农业大学	是	129
5	Zhu Xia*等. Ammonia Oxidation Pathways and Nitrifier Denitrification Are Significant Sources of N_2O and NO Under Low Oxygen Availability. Proceedings of the National Academy of Sciences of the United States of America, 2013, 110(16): 6328-6333.	中国科学院成都生物研究所†	是	128
6	Zhuang Jiangxing*等. Condensed Tannins from Ficus Virens as Tyrosinase Inhibitors: Structure, Inhibitory Activity and Molecular Mechanism. PLoS One, 2014, 9(3): 1-12.	厦门大学†	-	127
7	Liu Shusheng*等. Species Concepts as Applied to the Whitefly Bemisia Tabaci Systematics: How Many Species Are There?. Journal of Integrative Agriculture, 2012, 11(2): 176-186.	浙江大学†	是	120
8	Chu Haiyan*等. Soil pH Drives the Spatial Distribution of Bacterial Communities Along Elevation on Changbai Mountain. Soil Biology & Biochemistry, 2013, 57: 204-211.	中国科学院南京土壤研究所†	-	118
9	Pan Genxing*等. Effect of Biochar Amendment on Maize Yield and Greenhouse Gas Emissions from a Soil Organic Carbon Poor Calcareous Loamy Soil from Central China Plain. Plant and Soil, 2012, 351: 263-275.	南京农业大学†	-	114
10	Pan Genxing*等. Biochar's Effect on Crop Productivity and the Dependence on Experimental Conditions-A Meta-Analysis of Literature Data. Plant and Soil, 2013, 373: 583-594.	南京农业大学†	是	111

实验室所发 SCI 论文（2017 年）

序号	通讯作者	论文题目	期刊名称	卷	期	起始页	末尾页	5 年平均影响因子
1.	韦中	Plant Breeding Goes Microbial	TRENDS IN PLANT SCIENCE	22	7	555	558	13.442
2.	陈效民	LS-SVM data mining analysis: how does biochar influence soil net nitrogen mineralization in the field?	JOURNAL OF SOILS AND SEDIMENTS	17	3	827	840	2.703
3.	陈效民	Effects of biochar on aggregate characteristics of upland red soil in subtropical China	ENVIRONMENTAL EARTH SCIENCES	76	10			1.844
4.	程琨	Mitigating greenhouse gas emissions in agriculture: From farm production to food consumption	JOURNAL OF CLEANER PRODUCTION	149		1011	1019	6.207
5.	郭世伟	Nitrate Increased Cucumber Tolerance to Fusarium Wilt by Regulating Fungal Toxin Production and Distribution	TOXINS	9	3			3.45
6.	郭世伟	The rice production practices of high yield and high nitrogen use efficiency in Jiangsu, China	SCIENTIFIC REPORTS	7				4.847
7.	郭世伟	Wilted cucumber plants infected by Fusarium oxysporum f. sp cucumerinum do not suffer from water shortage	ANNALS OF BOTANY	120	3	427	436	4.217
8.	郭世伟	Improving rice population productivity by reducing nitrogen rate and increasing plant density	PLOS ONE	12	8			3.394
9.	郭世伟	Nitrate increases ethylene production and aerenchyma formation in roots of lowland rice plants under water stress	FUNCTIONAL PLANT BIOLOGY	44	4	430	442	2.888

10.	胡锋	Phylogenetic evaluation of Amynthas earthworms from South China reveals the initial ancestral state of spermathecae	MOLECULAR PHYLOGENETICS AND EVOLUTION	115		106	114	4.462
11.	胡水金	Long-term nitrogen & phosphorus additions reduce soil microbial respiration but increase its temperature sensitivity in a Tibetan alpine meadow	SOIL BIOLOGY & BIOCHEMISTRY	113		26	34	5.437
12.	胡水金	Differential responses of soil bacterial communities to long-term N and P inputs in a semi-arid steppe	GEODERMA	292		25	33	4.163
13.	胡水金	Taxonomic resolution is a determinant of biodiversity effects in arbuscular mycorrhizal fungal communities	JOURNAL OF ECOLOGY	105	1	219	228	6.499
14.	胡水金	Effects of elevated atmospheric CO2 on dissolution of geological fluorapatite in water and soil	SCIENCE OF THE TOTAL ENVIRONMENT	599		1382	1387	5.102
15.	胡水金	Physical access for residue-mineral interactions controls organic carbon retention in an Oxisol soil	SCIENTIFIC REPORTS	7				4.847
16.	李辉信	Bacterial traits and quality contribute to the diet choice and survival of bacterial-feeding nematodes	SOIL BIOLOGY & BIOCHEMISTRY	115		467	474	5.437
17.	李恋卿	Contribution of Soluble Minerals in Biochar to Pb2+ Adsorption in Aqueous Solutions	BIORESOURCES	12	1	1662	1679	1.73
18.	李荣	Novel soil fumigation strategy suppressed plant-parasitic nematodes associated with soil nematode community alterations in the field	APPLIED SOIL ECOLOGY	121		135	142	3.224
19.	李荣	Inducing the rhizosphere microbiome by biofertilizer application to suppress banana Fusarium wilt disease	SOIL BIOLOGY & BIOCHEMISTRY	104		39	48	5.437

20.	李荣	Bio-fertilizer application induces soil suppressiveness against Fusarium wilt disease by reshaping the soil microbiome	SOIL BIOLOGY & BIOCHEMISTRY	114		238	247	5.437
21.	李荣	Isolation of Antagonistic Endophytes from Banana Roots against Meloidogyne javanica and Their Effects on Soil Nematode Community	FRONTIERS IN MICROBIOLOGY	8				4.526
22.	李兆富	Comprehensive study on parameter sensitivity for flow and nutrient modeling in the Hydrological Simulation Program Fortran model	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	24	26	20982	20994	3.023
23.	胡水金	Characterizing the Mechanisms of Lead Immobilization via Bioapatite and Various Clay Minerals	ACS EARTH AND SPACE CHEMISTRY	1	3	152	157	0
24.	胡水金	Temperature-related changes of Ca and P release in synthesized hydroxylapatite, geological fluorapatite, and bone bioapatite	CHEMICAL GEOLOGY	451		183	188	4.038
25.	凌宁	Long-term fertilisation regimes affect the composition of the alkaline phosphomonoesterase encoding microbial community of a vertisol and its derivative soil fractions	BIOLOGY AND FERTILITY OF SOILS	53	4	375	388	3.773
26.	刘满强	Soil nematode community varies between rice cultivars but is not affected by transgenic Bt rice expressing Cry1Ab or Cry1Ab/Cry1Ac	BIOLOGY AND FERTILITY OF SOILS	53	5	501	509	3.773
27.	刘满强	Responses of rice paddy micro-food webs to elevated CO2 are modulated by nitrogen fertilization and crop cultivars	SOIL BIOLOGY & BIOCHEMISTRY	114		104	113	5.437

28.	潘根兴	Abundance and composition response of wheat field soil bacterial and fungal communities to elevated CO2 and increased air temperature	BIOLOGY AND FERTILITY OF SOILS	53	1	3	8	3.773
29.	潘根兴	The molecular properties of biochar carbon released in dilute acidic solution and its effects on maize seed germination	SCIENCE OF THE TOTAL ENVIRONMENT	576		858	867	5.102
30.	潘根兴	Changes in microbial biomass and the metabolic quotient with biochar addition to agricultural soils: A Meta-analysis	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	239		80	89	4.678
31.	潘根兴	Biochar compound fertilizer increases nitrogen productivity and economic benefits but decreases carbon emission of maize production	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	241		70	78	4.678
32.	潘根兴	Factors influencing farmers' participation in crop intensification program in Rwanda	JOURNAL OF INTEGRATIVE AGRICULTURE	16	6	1406	1416	1.131
33.	潘建君	Mapping Winter Wheat with Multi-Temporal SAR and Optical Images in an Urban Agricultural Region	SENSORS	17	6			2.964
34.	沈标	Competitive use of root exudates by Bacillus amyloliquefaciens with Ralstonia solanacearum decreases the pathogenic population density and effectively controls tomato bacterial wilt	SCIENTIA HORTICULTURAE	218		132	138	1.883
35.	胡锋	Dynamic interplay between microbial denitrification and antibiotic resistance under enhanced anoxic denitrification condition in soil	ENVIRONMENTAL POLLUTION	222		583	591	5.552

36.	韦中	Resource availability modulates biodiversity-invasion relationships by altering competitive interactions	ENVIRONMENTAL MICROBIOLOGY	19	8	2984	2991	5.965
37.	韦中	Bacterial Wilt in China: History, Current Status, and Future Perspectives	FRONTIERS IN PLANT SCIENCE	8				4.672
38.	韦中	Parasites and competitors suppress bacterial pathogen synergistically due to evolutionary trade-offs	EVOLUTION	71	3	733	746	4.559
39.	徐阳春	Application of biochar reduces Ralstonia solanacearum infection via effects on pathogen chemotaxis, swarming motility, and root exudate adsorption	PLANT AND SOIL	415	42737	269	281	3.736
40.	胡锋	Isolated Pseudomonas aeruginosa strain VIH2 and antagonistic properties against Ralstonia solanacearum	MICROBIAL PATHOGENESIS	111		519	526	2.043
41.	熊正琴	Dynamic responses of nitrous oxide emission and nitrogen use efficiency to nitrogen and biochar amendment in an intensified vegetable field in southeastern China	GLOBAL CHANGE BIOLOGY BIOENERGY	9	2	400	413	5.434
42.	熊正琴	Biochar reduces yield-scaled emissions of reactive nitrogen gases from vegetable soils across China	BIOGEOSCIENCES	14	11	2851	2863	4.618
43.	胡锋	Activation and beta-FeOOH modification of sepiolite in one-step hydrothermal reaction and its simulated solar light catalytic reduction of Cr(VI)	APPLIED CLAY SCIENCE	135		547	553	3.391
44.	徐阳春	Probiotic Pseudomonas communities enhance plant growth and nutrient assimilation via diversity-mediated ecosystem functioning	SOIL BIOLOGY & BIOCHEMISTRY	113		122	129	5.437

45.	徐阳春	Seasonal variation in the biocontrol efficiency of bacterial wilt is driven by temperature-mediated changes in bacterial competitive interactions	JOURNAL OF APPLIED ECOLOGY	54	5	1440	1448	5.989
46.	徐阳春	Chryseobacterium nankingense sp nov WR21 effectively suppresses Ralstonia solanacearum growth via intensive root exudates competition	BIOCONTROL	62	4	567	577	2.088
47.	张瑞福	Alteration of soil bacterial interaction networks driven by different long-term fertilization management practices in the red soil of South China	APPLIED SOIL ECOLOGY	120		128	134	3.224
48.	张瑞福	Two degradation strategies for overcoming the recalcitrance of natural lignocellulosic xylan by polysaccharides-binding GH10 and GH11 xylanases of filamentous fungi	ENVIRONMENTAL MICROBIOLOGY	19	3	1054	1064	5.965
49.	张瑞福	Identification of Root-Secreted Compounds Involved in the Communication Between Cucumber, the Beneficial Bacillus amyloliquefaciens, and the Soil-Borne Pathogen Fusarium oxysporum	MOLECULAR PLANT-MICROBE INTERACTIONS	30	1	53	62	4.598
50.	张瑞福	Beneficial Rhizobacterium Bacillus amyloliquefaciens SQR9 Induces Plant Salt Tolerance through Spermidine Production	MOLECULAR PLANT-MICROBE INTERACTIONS	30	5	423	432	4.598
51.	邹建文	A meta-analysis of fertilizer-induced soil NO and combined NO+N2O emissions	GLOBAL CHANGE BIOLOGY	23	6	2520	2532	9.455
52.	邹建文	Microbial Abundances Predict Methane and Nitrous Oxide Fluxes from a Windrow Composting System	FRONTIERS IN MICROBIOLOGY	8				4.526

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1.	通讯作者	论文题目	期刊名称	卷	期	起始页	末尾页	5 年平均影响因子
2.	潘根兴	Water Extract from Straw Biochar Used for Plant Growth Promotion: An Initial Test	BIORESOURCES	11	1	249	266	1.645
3.	刘树伟	A comparison of methane emissions following rice paddies conversion to crab-fish farming wetlands in southeast China	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	23	2	1505	1515	2.876
4.	刘满强	Different effects of invader-native phylogenetic relatedness on invasion success and impact: a meta-analysis of Darwin's naturalization hypothesis	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	283	1840			5.366
5.	熊正琴	Biochar stability in soil: meta-analysis of decomposition and priming effects	GLOBAL CHANGE BIOLOGY BIOENERGY	8	3	512	523	6.415
6.	李辉信	Sublethal Toxicity Endpoints of Heavy Metals to the Nematode Caenorhabditis elegans	PLOS ONE	11	1			3.535
7.	陈效民	Effects of applying flue gas desulfurization gypsum and humic acid on soil physicochemical properties and rapeseed yield of a saline-sodic cropland in the eastern coastal area of China	JOURNAL OF SOILS AND SEDIMENTS	16	1	38	50	2.389

8.	陈效民	The effects of biochar and hoggery biogas slurry on fluvo-aquic soil physical and hydraulic properties: a field study of four consecutive wheat-maize rotations	JOURNAL OF SOILS AND SEDIMENTS	16	8	2050	2058	2.389
9.	陈效民	Impact of flue gas desulfurization gypsum and lignite humic acid application on soil organic matter and physical properties of a saline-sodic farmland soil in Eastern China	JOURNAL OF SOILS AND SEDIMENTS	16	9	2175	2185	2.389
10.	陈效民	Biochar impact on nitrate leaching in upland red soil, China	ENVIRONMENTAL EARTH SCIENCES	75	14			0
11.	陈效民	Dynamics of soil available phosphorus and its impact factors under simulated climate change in typical farmland of Taihu Lake region, China	ENVIRONMENTAL MONITORING AND ASSESSMENT	188	2			1.921
12.	程琨	Size and variability of crop productivity both impacted by CO2 enrichment and warming-A case study of 4 year field experiment in a Chinese paddy	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	221		40	49	4.233
13.	郭世伟	Root ABA Accumulation Enhances Rice Seedling Drought Tolerance under Ammonium Supply: Interaction with Aquaporins	FRONTIERS IN PLANT SCIENCE	7				4.461
14.	郭世伟	The Interactions of Aquaporins and Mineral Nutrients in Higher Plants	INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES	17	8			3.213

15.	郭世伟	Effects of soil zinc availability, nitrogen fertilizer rate and zinc fertilizer application method on zinc biofortification of rice	JOURNAL OF AGRICULTURAL SCIENCE	154	4	584	597	1.692
16.	胡锋	Two new species of Tomocerus ocreatus complex (Collembola, Tomoceridae) from Nanjing, China	ZOOTAXA	4084	1	125	134	0.91
17.	李辉信	Bottom-up control of fertilization on soil nematode communities differs between crop management regimes	SOIL BIOLOGY & BIOCHEMISTRY	95		198	201	5.041
18.	李辉信	Carbon-rich organic fertilizers to increase soil biodiversity: Evidence from a meta-analysis of nematode communities	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	223		199	207	4.233
19.	李辉信	Soil Nitrogen Status Modifies Rice Root Response to Nematode-Bacteria Interactions in the Rhizosphere	PLOS ONE	11	2			3.535
20.	李辉信	Function of Nitrate Ion and Tea Saponin Application Rates in Anerobic PAH Dissipation in Paddy Soil	CLEAN-SOIL AIR WATER	44	6	667	676	1.99
21.	李辉信	Soil nematode community response to fertilisation in the root-associated and bulk soils of a rice-wheat agroecosystem	NEMATOLOGY	18		727	741	1.087

22.	李恋卿	Low uptake affinity cultivars with biochar to tackle Cd-tainted rice - A field study over four rice seasons in Hunan, China	SCIENCE OF THE TOTAL ENVIRONMENT	541		1489	1498	4.317
23.	李恋卿	Methanogenic abundance and changes in community structure along a rice soil chronosequence from east China	EUROPEAN JOURNAL OF SOIL SCIENCE	67	4	443	455	3.511
24.	李恋卿	Changes in organic carbon and nitrogen in soil with metal pollution by Cd, Cu, Pb and Zn: a meta-analysis	EUROPEAN JOURNAL OF SOIL SCIENCE	67	2	237	246	3.511
25.	李恋卿	Continuous immobilization of cadmium and lead in biochar amended contaminated paddy soil: A five-year field experiment	ECOLOGICAL ENGINEERING	93		1	8	3.223
26.	李恋卿	Functional and structural responses of bacterial and fungal communities from paddy fields following long-term rice cultivation	JOURNAL OF SOILS AND SEDIMENTS	16	5	1460	1471	2.389
27.	李荣	Continous application of bioorganic fertilizer induced resilient culturable bacteria community associated with banana Fusarium wilt suppression	SCIENTIFIC REPORTS	6				5.525
28.	李荣	Amino Acids Hydrolyzed from Animal Carcasses Are a Good Additive for the Production of Bio-organic Fertilizer	FRONTIERS IN MICROBIOLOGY	7				4.36

29.	李荣	Bacillus amyloliquefaciens Strain W19 can Promote Growth and Yield and Suppress Fusarium Wilt in Banana Under Greenhouse and Field Conditions	PEDOSPHERE	26	5	733	744	2.081
30.	凌宁	Impacts of Fertilization Regimes on Arbuscular Mycorrhizal Fungal (AMF) Community Composition Were Correlated with Organic Matter Composition in Maize Rhizosphere Soil	FRONTIERS IN MICROBIOLOGY	7				4.36
31.	凌宁	Quantitative and compositional responses of ammonia-oxidizing archaea and bacteria to long-term field fertilization	SCIENTIFIC REPORTS	6				5.525
32.	郭世伟	Soil ionomic and enzymatic responses and correlations to fertilizations amended with and without organic fertilizer in long-term experiments	SCIENTIFIC REPORTS	6				5.525
33.	刘满强	Vermicompost increases defense against root-knot nematode (Meloidogyne incognita) in tomato plants	APPLIED SOIL ECOLOGY	105		177	186	3.103
34.	刘满强	New cave-dwelling species of Tomoceridae from China, with a study on the pattern of mesothoracic bothriotricha in Tomocerinae (Collembola, Entomobryomorpha)	ZOOKEYS		574	81	95	1.012

35.	刘树伟	Annual accounting of net greenhouse gas balance response to biochar addition in a coastal saline bioenergy cropping system in China	SOIL & TILLAGE RESEARCH	158		39	48	3.371
36.	刘晓雨	Changes in micronutrient availability and plant uptake under simulated climate change in winter wheat field	JOURNAL OF SOILS AND SEDIMENTS	16	12	2666	2675	2.389
37.	刘晓雨	Biochar helps enhance maize productivity and reduce greenhouse gas emissions under balanced fertilization in a rainfed low fertility inceptisol	CHEMOSPHERE	142		106	113	4.068
38.	刘志鹏	Spatiotemporal analysis of multiscalar drought characteristics across the Loess Plateau of China	JOURNAL OF HYDROLOGY	534		281	299	3.882
39.	潘根兴	Responses of Methanogenic and Methanotrophic Communities to Elevated Atmospheric CO2 and Temperature in a Paddy Field	FRONTIERS IN MICROBIOLOGY	7				4.36
40.	潘根兴	Change in active microbial community structure, abundance and carbon cycling in an acid rice paddy soil with the addition of biochar	EUROPEAN JOURNAL OF SOIL SCIENCE	67	6	857	867	3.511

41.	潘根兴	Abundance, composition and activity of denitrifier communities in metal polluted paddy soils	SCIENTIFIC REPORTS	6				5.525
42.	潘根兴	Biochar has no effect on soil respiration across Chinese agricultural soils	SCIENCE OF THE TOTAL ENVIRONMENT	554		259	265	4.317
43.	潘根兴	Is current biochar research addressing global soil constraints for sustainable agriculture?	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	226		25	32	4.233
44.	潘根兴	Pyrolysis of crop residues in a mobile bench-scale pyrolyser: Product characterization and environmental performance	JOURNAL OF ANALYTICAL AND APPLIED PYROLYSIS	119		52	59	3.912
45.	潘根兴	Quantification of biochar effects on soil hydrological properties using meta-analysis of literature data	GEODERMA	274		28	34	3.31
46.	潘根兴	Irrigation regime affected SOC content rather than plow layer thickness of rice paddies: A county level survey from a river basin in lower Yangtze valley, China	AGRICULTURAL WATER MANAGEMENT	172		31	39	3.37
47.	潘根兴	Farm and product carbon footprints of China's fruit production-life cycle inventory of representative orchards of five major fruits	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	23	5	4681	4691	2.876

48.	潘根兴	Cd immobilization in a contaminated rice paddy by inorganic stabilizers of calcium hydroxide and silicon slag and by organic stabilizer of biochar	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	23	10	10028	10036	2.876
49.	潘根兴	Factors influencing the adoption of soil conservation techniques in Northern Rwanda	JOURNAL OF PLANT NUTRITION AND SOIL SCIENCE	179	3	367	375	1.951
50.	潘剑君	Influence of tillage practices and straw incorporation on soil aggregates, organic carbon, and crop yields in a rice-wheat rotation system	SCIENTIFIC REPORTS	6				5.525
51.	沈标	Biological Potential of Bioorganic Fertilizer Fortified with Bacterial Antagonist for the Control of Tomato Bacterial Wilt and the Promotion of Crop Yields	JOURNAL OF MICROBIOLOGY AND BIOTECHNOLOGY	26	10	1755	1764	1.705
52.	沈标	Effects of organic-inorganic compound fertilizer with reduced chemical fertilizer application on crop yields, soil biological activity and bacterial community structure in a rice-wheat cropping system	APPLIED SOIL ECOLOGY	99		1	12	3.103
53.	沈标	Biological control of tobacco bacterial wilt using Trichoderma harzianum amended bioorganic fertilizer and the arbuscular mycorrhizal fungi Glomus mosseae	BIOLOGICAL CONTROL	92		164	171	2.205

54.	徐阳春	Pathogen invasion indirectly changes the composition of soil microbiome via shifts in root exudation profile	BIOLOGY AND FERTILITY OF SOILS	52	7	997	1005	3.287
55.	熊正琴	Enhanced gross nitrogen transformation rates and nitrogen supply in paddy field under elevated atmospheric carbon dioxide and temperature	SOIL BIOLOGY & BIOCHEMISTRY	94		80	87	5.041
56.	熊正琴	Global warming potential and greenhouse gas intensity in rice agriculture driven by high yields and nitrogen use efficiency	BIOGEOSCIENCES	13	9	2701	2714	4.477
57.	熊正琴	Effects of organic fertilizer on net global warming potential under an intensively managed, vegetable field in southeastern China: A three-year field study	ATMOSPHERIC ENVIRONMENT	145		92	103	3.841
58.	熊正琴	Soil concentration profiles and diffusion and emission of nitrous oxide influenced by the application of biochar in a rice-wheat annual rotation system	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	23	8	7949	7961	2.876
59.	熊正琴	Contrasting effects of aged and fresh biochars on glucose-induced priming and microbial activities in paddy soil	JOURNAL OF SOILS AND SEDIMENTS	16	1	191	203	2.389
60.	熊正琴	Carbon budget by priming in a biochar-amended soil	EUROPEAN JOURNAL OF SOIL BIOLOGY	76		26	34	2.473

61.	熊正琴	Contrasting effects of elevated CO2 and warming on temperature sensitivity of soil organic matter decomposition in a Chinese paddy field	ENVIRONMENTAL MONITORING AND ASSESSMENT	188	10			1.921
62.	徐阳春	Bacillus amyloliquefaciens T-5 may prevent Ralstonia solanacearum infection through competitive exclusion	BIOLOGY AND FERTILITY OF SOILS	52	3	341	351	3.287
63.	徐阳春	Isolation and Identification of Antifungal Compounds Produced by Bacillus Y-IVI for Suppressing Fusarium Wilt of Muskmelon	PLANT PROTECTION SCIENCE	52	3	167	175	0
64.	张楠	Induced maize salt tolerance by rhizosphere inoculation of Bacillus amyloliquefaciens SQR9	PHYSIOLOGIA PLANTARUM	158	1	34	44	3.799
65.	张瑞福	Characterization of extracellular polymeric substances of Bacillus amyloliquefaciens SQR9 induced by root exudates of cucumber	JOURNAL OF BASIC MICROBIOLOGY	56	11	1183	1193	1.671
66.	张瑞福	Significant alteration of soil bacterial communities and organic carbon decomposition by different long-term fertilization management conditions of extremely low-productivity arable soil in South China	ENVIRONMENTAL MICROBIOLOGY	18	6	1907	1917	6.288
67.	张瑞福	Alteration of the soil bacterial community during parent material maturation driven by different fertilization treatments	SOIL BIOLOGY & BIOCHEMISTRY	96		207	215	5.041

68.	张瑞福	Long-term organic-inorganic fertilization ensures great soil productivity and bacterial diversity after natural-to-agricultural ecosystem conversion	JOURNAL OF MICROBIOLOGY	54	9	611	617	1.644
69.	邹建文	Linking N2O emission from biochar-amended composting process to the abundance of denitrify (nirK and nosZ) bacteria community	AMB EXPRESS	6				2.419
70.	邹建文	Methane and Nitrous Oxide Emissions Reduced Following Conversion of Rice Paddies to Inland Crab Fish Aquaculture in Southeast China	ENVIRONMENTAL SCIENCE & TECHNOLOGY	50	2	633	642	6.396
71.	邹建文	Response of nitric and nitrous oxide fluxes to N fertilizer application in greenhouse vegetable cropping systems in southeast China	SCIENTIFIC REPORTS	6				5.525
72.	邹建文	Response of soil carbon dioxide fluxes, soil organic carbon and microbial biomass carbon to biochar amendment: a meta-analysis	GLOBAL CHANGE BIOLOGY BIOENERGY	8	2	392	406	6.415
73.	邹建文	UV-B has larger negative impacts on invasive populations of Triadica sebifera but ozone impacts do not vary	JOURNAL OF PLANT ECOLOGY	9	1	61	68	2.519
74.	邹建文	Soil Respiration and Litter Decomposition Increased Following Perennial Forb Invasion into an Annual Grassland	PEDOSPHERE	26	4	567	576	2.081

实验室所发SCI论文（2015年）

号	通讯作者	论文题目	期刊名称	5年平均影响因子
1.	郭世伟	Water absorption is affected by the nitrogen supply to rice plants	PLANT AND SOIL	3.528
2.	蒋静艳	Application of herbicides is likely to reduce greenhouse gas (N2O and CH4) emissions from rice-wheat cropping systems	ATMOSPHERIC ENVIRONMENT 卷: 107 页: 62-69 DOI: 10.1016/j.atmosenv.2015.02.029 出版年: APR 2015	3.78
3.	熊正琴	Effects of biochar amendment on greenhouse gas emissions, net ecosystem carbon budget and properties of an acidic soil under intensive vegetable production	SOIL USE AND MANAGEMENT	1.466
4.	程琨	A comparative study on carbon footprint of rice production between household and aggregated farms from Jiangxi, China	ENVIRONMENTAL MONITORING AND ASSESSMENT 卷: 187 期: 6 文献号:332 DOI: 10.1007/s10661-015-4572-9 出版年: JUN 2015	1.918
5.	程琨	Carbon footprint of China's livestock system - a case study of farm survey in Sichuan province, China	JOURNAL OF CLEANER PRODUCTION 卷: 102 页: 136-143 DOI: 10.1016/j.jclepro.2015.04.077 出版年:SEP 1 2015	4.167
6.	郭世伟	Water balance altered in cucumber plants infected with Fusarium oxysporum f. sp cucumerinum	SCIENTIFIC REPORTS 卷:5 文献号: 7722 DOI: 10.1038/srep07722 出版年: JAN 12 2015	5.597
7.	胡锋	Effects of Indole-3-Acetic Acid (IAA), a Plant Hormone, on the Ryegrass Yield and the Removal of Fluoranthene from Soil	INTERNATIONAL JOURNAL OF PHYTOREMEDIATION 卷： 17 期： 5 页： 422-428 DOI:10.1080/15226514.2014.910172 出版年:2015	1.875

8.	李辉信	EFFECTS OF BENZO[A]PYRENE ON GROWTH, THE ANTIOXIDANT SYSTEM, AND DNA DAMAGE IN EARTHWORMS (EISENIA FETIDA) IN 2 DIFFERENT SOIL TYPES UNDER LABORATORY CONDITIONS	ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY 卷: 34 期: 2 页: 283-290 DOI: 10.1002/etc.2785 出版年: FEB 2015	3.246
9.	李辉信	Low-molecular-weight organic acids enhance desorption of polycyclic aromatic hydrocarbons from soil	EUROPEAN JOURNAL OF SOIL SCIENCE 卷: 66 期: 2 页: 339-347 DOI: 10.1111/ejss.12227 出版年: MAR 2015	3.487
10.	李辉信	Effects of Interactions of Auxin-Producing Bacteria and Bacterial-Feeding Nematodes on Regulation of Peanut Growths	PLOS ONE 卷 : 10 期 : 4 文献号 : e0124361 DOI: 10.1371/journal.pone.0124361 出版年: APR 13 2015	3.702
11.	李辉信	Bacterial Respiration and Growth Rates Affect the Feeding Preferences, Brood Size and Lifespan of Caenorhabditis elegans	PLOS ONE 卷 : 10 期 : 7 文献号 : e0134401 DOI: 10.1371/journal.pone.0134401 出版年: JUL 29 2015	3.702
12.	李荣	Suppression on plant-parasitic nematodes using a soil fumigation strategy based on ammonium bicarbonate and its effects on the nematode community	SCIENTIFIC REPORTS	5.597
13.	李荣	Soils naturally suppressive to banana Fusarium wilt disease harbor unique bacterial communities	PLANT AND SOIL 卷: 393 期: 1-2 页: 21-33 DOI: 10.1007/s11104-015-2474-9 出版年: AUG 2015	3.528
14.	李荣	Rhizosphere microbial community manipulated by 2 years of consecutive biofertilizer application associated with banana Fusarium wilt disease suppression	BIOLOGY AND FERTILITY OF SOILS 卷: 51 期: 5 页: 553-562 DOI: 10.1007/s00374-015-1002-7 出版年: JUL 2015	3.145
15.	李荣	Exploring a soil fumigation strategy based on ammonium bicarbonate to control Fusarium wilts of cucurbits	CROP PROTECTION 卷: 70 页: 53-60 DOI: 10.1016/j	1.635

			.cropro.2015.01.004 出版年: APR 2015	
16.	李荣	Effect of biofertilizer for suppressing Fusarium wilt disease of banana as well as enhancing microbial and chemical properties of soil under greenhouse trial	APPLIED SOIL ECOLOGY 卷: 93 页: 111-119 DOI: 10.1016/j.apsoil.2015.04.013 出版年: SEP 2015	3.105
17.	李荣	Effect of the combination of bio-organic fertiliser with Bacillus amyloliquefaciens NJN-6 on the control of banana Fusarium wilt disease, crop production and banana rhizosphere culturable microflora	BIOCONTROL SCIENCE AND TECHNOLOGY 卷: 25 期: 6 页: 716-731 DOI: 10.1080/09583157.2015.1010482 出版年: 2015	1.009
18.	李荣	The Nematicidal Effect of Camellia Seed Cake on Root-Knot Nematode Meloidogyne javanica of Banana	PLOS ONE 卷: 10 期: 4 文献号: e0119700 DOI: 10.1371/journal.pone.0119700 出版年: APR 7 2015	3.702
19.	李荣	Utilization of different waste proteins to create a novel PGPR-containing bio-organic fertilizer	SCIENTIFIC REPORTS 卷: 5 文献号: 7766 DOI: 10.1038/srep07766 出版年: JAN 14 2015	5.597
20.	李兆富	Evaluation of the AnnAGNPS Model for Predicting Runoff and Nutrient Export in a Typical Small Watershed in the Hilly Region of Taihu Lake	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	2.063
21.	李兆富	Simulation of runoff and nutrient export from a typical small watershed in China using the Hydrological Simulation Program-Fortran	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH 卷: 22 期: 10 页: 7954-7966 DOI: 10.1007/s11356-014-3960-y 出版年: MAY 2015	2.92
22.	刘满强	Earthworm ecosystem service and dis-service in an N-enriched agroecosystem: Increase of plant production leads to no effects on yield-scaled N2O emissions	SOIL BIOLOGY & BIOCHEMISTRY 卷: 82 页: 1-8 DOI: 10.1016/j.soilbio.2014.12.009 出版年: MAR 2015	4.953

23.	刘满强	Resource utilization capability of bacteria predicts their invasion potential in soil	SOIL BIOLOGY & BIOCHEMISTRY 卷: 81 页: 287-290 DOI: 10.1016/j.soilbio.2014.11.025 出版年: FEB 2015	4.953
24.	刘满强	Effects of intraspecific variation in rice resistance to aboveground herbivore, brown planthopper, and rice root nematodes on plant yield, labile pools of plant, and rhizosphere soil	BIOLOGY AND FERTILITY OF SOILS 卷: 51 期: 4 页: 417-425 DOI: 10.1007/s00374-014-0985-9 出版年: MAY 2015	3.145
25.	刘满强	Interaction matters: Synergy between vermicompost and PGPR agents improves soil quality, crop quality and crop yield in the field	APPLIED SOIL ECOLOGY 卷: 89 页: 25-34 DOI: 10.1016/j.apsoil.2015.01.005 出版年: MAY 2015	3.105
26.	刘树伟	Optimizing net greenhouse gas balance of a bioenergy cropping system in southeast China with urease and nitrification inhibitors	ECOLOGICAL ENGINEERING	3.231
27.	潘根兴	Short-term response of nitrifier communities and potential nitrification activity to elevated CO2 and temperature interaction in a Chinese paddy field	APPLIED SOIL ECOLOGY	3.105
28.	潘根兴	Enhanced rice production but greatly reduced carbon emission following biochar amendment in a metal-polluted rice paddy	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	2.92
29.	潘根兴	Changes in soil microbial community structure and enzyme activity with amendment of biochar-manure compost and pyroligneous solution in a saline soil from Central China	EUROPEAN JOURNAL OF SOIL BIOLOGY	1.719
30.	潘根兴	Long-term rice cultivation stabilizes soil organic carbon and promotes soil microbial activity in a salt marsh derived soil chronosequence	SCIENTIFIC REPORTS	5.597

31.	潘根兴	Carbon footprint of crop production in China: an analysis of National Statistics data	JOURNAL OF AGRICULTURAL SCIENCE 卷: 153 期: 3 页: 422-431 DOI: 10.1017/S0021859614000665 出版年: APR 2015	0.424
32.	潘根兴	Biochar-manure compost in conjunction with pyroligneous solution alleviated salt stress and improved leaf bioactivity of maize in a saline soil from central China: a 2-year field experiment	JOURNAL OF THE SCIENCE OF FOOD AND AGRICULTURE 卷: 95 期: 6 页: 1321-1327 DOI: 10.1002/jsfa.6825 出版年: APR 2015	1.994
33.	潘根兴	Consistent increase in abundance and diversity but variable change in community composition of bacteria in topsoil of rice paddy under short term biochar treatment across three sites from South China	APPLIED SOIL ECOLOGY 卷: 91 页: 68-79 DOI: 10.1016/j.apsoil.2015.02.012 出版年: JUL 2015	3.105
34.	潘根兴	Carbon footprint of grain crop production in China - based on farm survey data	JOURNAL OF CLEANER PRODUCTION 卷: 104 页: 130-138 DOI: 10.1016/j.jclepro.2015.05.058 出版年: OCT 1 2015	4.167
35.	潘根兴	Root-Derived Short-Chain Suberin Diacids from Rice and Rape Seed in a Paddy Soil under Rice Cultivar Treatments	PLOS ONE 卷: 10 期: 5 文献号: DOI: 10.1371/journal.pone.0127474 出版年: MAY 11 2015	3.702
36.	潘根兴	Does metal pollution matter with C retention by rice soil?	SCIENTIFIC REPORTS 卷: 5 文献号: 13233 DOI: 10.1038/srep13233 出版年: AUG 14 2015	5.597
37.	沈标	A phcA(-) marker-free mutant of Ralstonia solanacearum as potential biocontrol agent of tomato bacterial wilt	BIOLOGICAL CONTROL	2.059

38.	沈标	Root exudates from two tobacco cultivars affect colonization of Ralstonia solanacearum and the disease index	EUROPEAN JOURNAL OF PLANT PATHOLOGY 卷: 141 期: 4 页: 667-677 DOI: 10.1007/s10658-014-0569-4 出版年: APR 2015	1.649
39.	熊正琴	Differences in net global warming potential and greenhouse gas intensity between major rice-based cropping systems in China	SCIENTIFIC REPORTS	5.597
40.	熊正琴	A 2-yr field assessment of the effects of chemical and biological nitrification inhibitors on nitrous oxide emissions and nitrogen use efficiency in an intensively managed vegetable cropping system	AGRICULTURE ECOSYSTEMS & ENVIRONMENT 卷: 201 页: 43-50 DOI: 10.1016/j.agee.2014.12.003 出版年: MAR 1 2015	3.987
41.	熊正琴	Mitigating net global warming potential and greenhouse gas intensities by substituting chemical nitrogen fertilizers with organic fertilization strategies in rice-wheat annual rotation systems in China: A 3-year field experiment	ECOLOGICAL ENGINEERING 卷: 81 页: 289-297 DOI: 10.1016/j.ecoleng.2015.04.071 出版年: AUG 2015	3.231
42.	熊正琴	Effects of elevated atmospheric CO2 concentration and temperature on the soil profile methane distribution and diffusion in rice-wheat rotation system	JOURNAL OF ENVIRONMENTAL SCIENCES-CHINA 卷: 32 页: 62-71 DOI: 10.1016/j.jes.2014.11.010 出版年: JUN 1 2015	2.533
43.	熊正琴	Combined effects of nitrogen fertilization and biochar on the net global warming potential, greenhouse gas intensity and net ecosystem economic budget in intensive vegetable agriculture in southeastern China	ATMOSPHERIC ENVIRONMENT 卷: 100 页: 10-19 DOI: 10.1016/j.atmosenv.2014.10.034 出版年: JAN 2015	3.78
44.	熊正琴	Net global warming potential and greenhouse gas intensity from the double rice system with integrated soil-crop system management: A three-year field study	ATMOSPHERIC ENVIRONMENT 卷: 116 页: 92-101 DOI: 10.1016/j.atmosenv.2015.06.018 出版年: SEP 2015	3.78

45.	熊正琴	The combined effects of nitrification inhibitor and biochar incorporation on yield-scaled N2O emissions from an intensively managed vegetable field in southeastern China	BIOGEOSCIENCES 卷: 12 期: 6 页: 2003-2017 DOI: 10.5194/bg-12-2003-2015 出版年: 2015	4.668
46.	徐阳春	Altering Transplantation Time to Avoid Periods of High Temperature Can Efficiently Reduce Bacterial Wilt Disease Incidence with Tomato	PLOS ONE	3.702
47.	徐阳春	Production and characterization of cellulolytic enzyme from Penicillium oxalicum GZ-2 and its application in lignocellulose saccharification	BIOMASS & BIOENERGY 卷: 74 页: 122-134 DOI: 10.1016 /j.biombioe.2015.01.016 出版年: MAR 2015	4.273
48.	徐阳春	Evaluation of the biocontrol potential of Streptomyces goshikiensis YCXU against Fusarium oxysporum f. sp niveum	BIOLOGICAL CONTROL 卷: 81 页: 101-110 DOI: 10.1016/j. biocontrol.2014.11.012 出版年: FEB 2015	2.059
49.	徐阳春	Identification and Characterization of MicroRNAs from Tree Peony (Paeonia ostii) and Their Response to Copper Stress	PLOS ONE 卷 : 10 期 : 2 文献号 : e0117584 DOI: 10.1371/journal.pone.0117584 出版年: FEB 6 2015	3.702
50.	徐阳春	Functional diversity and properties of multiple xylanases from Penicillium oxalicum GZ-2	SCIENTIFIC REPORTS 卷 : 5 文献号: 12631 DOI: 10.1038/srep12631 出版年: JUL 30 2015	5.597
51.	张瑞福	Environmental conditions rather than microbial inoculum composition determine the bacterial composition, microbial biomass and enzymatic activity of reconstructed soil microbial communities	SOIL BIOLOGY & BIOCHEMISTRY	4.953
52.	张瑞福	Parental material and cultivation determine soil bacterial community structure and fertility	FEMS MICROBIOLOGY ECOLOGY 卷: 91 期: 1 DOI: 10.1093/femsec/fiu010 出版年: JAN 2015	4.087

53.	张瑞福	Contribution of indole-3-acetic acid in the plant growth promotion by the rhizospheric strain Bacillus amyloliquefaciens SQR9	BIOLOGY AND FERTILITY OF SOILS 卷: 51 期: 3 页: 321-330 DOI: 10.1007/ s00374-014-0978-8 出版年: APR 2015	3.145
54.	张瑞福	Contribution of indole-3-acetic acid in the plant growth promotion by the rhizospheric strain Bacillus amyloliquefaciens SQR9 (vol 51, pg 321, 2015)	BIOLOGY AND FERTILITY OF SOILS	3.145
55.	张瑞福	Genome-wide transcriptomic analysis of a superior biomass-degrading strain of A-fumigatus revealed active lignocellulose-degrading genes	BMC GENOMICS 卷: 16 文献号: 459 DOI: 10.1186/s12864-015-1658-2 出版年: JUN 16 2015	4.36
56.	张瑞福	Characterization and identification of the xylanolytic enzymes from Aspergillus fumigatus Z5	BMC MICROBIOLOGY 卷: 15 文献号: 126 DOI: 10.1186/s12866-015-0463-z 出版年: JUN 23 2015	3.251
57.	邹建文	Response of rice production to elevated [CO2] and its interaction with rising temperature or nitrogen supply: a meta-analysis	CLIMATIC CHANGE 卷: 130 期: 4 页: 529-543 DOI: 10.1007/s10584-015-1374-6 出版年: JUN 2015	4.61
58.	邹建文	Annual net greenhouse gas balance in a halophyte (Helianthus tuberosus) bioenergy cropping system under various soil practices in Southeast China	GLOBAL CHANGE BIOLOGY BIOENERGY 卷: 7 期: 4 页: 690-703 DOI: 10.1111/gcbb.12185 出版年: JUL 2015	5.473

实验室 7 人于 2017 年 9 月 3-8 日参加在英国洛桑试验站召开的第 6 届国际土壤有机质大会


MBC/SOC across ecosystems
Thank you!


carbon stability and

实验室于 2017 年 11 月 18-21 日主办中国—东盟生物质炭生产与绿色农业应用研讨会

依托学科农业资源与环境入选国家“双一流”建设学科

信息名称： 教育部 财政部 国家发展改革委关于公布世界一流大学和一流学科建设高校及建设学科名单的通知

信息索引： 360A22-07-2017-0005-1 **生成日期：** 2017-09-21 **发文机构：** 教育部、财政部、国家发展改革委

发文字号： 教研函〔2017〕2号 **信息类别：** 高等教育

内容概述： 教育部、财政部、国家发展改革委公布世界一流大学和一流学科建设高校及建设学科名单。

中华人民共和国教育部

教研函〔2017〕2号

教育部 财政部 国家发展改革委
关于公布世界一流大学和一流学科建设高校及建设
学科名单的通知

各省、自治区、直辖市人民政府，新疆生产建设兵团，国务院各部委、各直属机构，中央军委训练管理部：

根据国务院《统筹推进世界一流大学和一流学科建设总体方案》以及教育部等三部委《统筹推进世界一流大学和一流学科建设实施办法（暂行）》，经专家委员会遴选认定，教育部、财政部、国家发展改革委研究并报国务院批准，现公布世界一流大学和一流学科（简称“双一流”）建设高校及建设学科名单。

各单位要全面贯彻习近平总书记系列重要讲话精神和全国高校思想政治工作会议精神，按照党中央、国务院关于建设世界一流大学和一流学科的决策部署，以马克思主义为指导，加强党对高校的领导，坚持社会主义办学方向，坚持中国特色、世界一流，坚持内涵建设，采取有力措施，支持推动建设高校及建设学科加快发展，取得更大建设成效。

特此通知。

附件：1. “双一流”建设高校名单

2. “双一流”建设学科名单

教育部 财政部 国家发展改革委

2017年9月20日

苏州大学：材料科学与工程（自定）

东南大学：材料科学与工程、电子科学与技术、信息与通信工程、控制科学与工程、计算机科学与技术、建筑学、土木工程、交通运输工程、生物医学工程、风景园林学、艺术学理论

南京航空航天大学：力学

南京理工大学：兵器科学与技术

中国矿业大学：安全科学与工程、矿业工程

南京邮电大学：电子科学与技术

河海大学：水利工程、环境科学与工程

江南大学：轻工技术与工程、食品科学与工程

南京林业大学：林业工程

南京信息工程大学：大气科学

南京农业大学：作物学、农业资源与环境

南京中医药大学：中药学

中国药科大学：中药学

南京师范大学：地理学

浙江大学：化学、生物学、生态学、机械工程、光学工程、材料科学与工程、电气工程、控制科学与工程、计算机科学与技术、农业工程、环境科学与工程、软件工程、园艺学、植物保护、基础医学、药学、管理科学与工程、农林经济管理

中国美术学院：美术学

安徽大学：材料科学与工程（自定）

依托学科获评全国第四轮学科评估 A 类学科，具体评估等级为 A+

一级学科代码及名称： 0903 农业资源与环境

本一级学科中，全国具有“博士授权”的高校共 19 所，本次参评 18 所；部分具有“硕士授权”的高校也参加了评估；参评高校共计 34 所（注：评估结果相同的高校排序不分先后，按学校代码排列）。

评估结果	学校代码及名称
A+	10307 南京农业大学
	10335 浙江大学
A-	10019 中国农业大学
B+	10504 华中农业大学
	10635 西南大学
	10712 西北农林科技大学
B	10157 沈阳农业大学
	10537 湖南农业大学
	10564 华南农业大学
	10626 四川农业大学
B-	10193 吉林农业大学
	10389 福建农林大学
	10434 山东农业大学
C+	10086 河北农业大学
	10113 山西农业大学
	10224 东北农业大学
	10341 浙江农林大学
C	10129 内蒙古农业大学
	10466 河南农业大学
	10676 云南农业大学
C-	10364 安徽农业大学
	10435 青岛农业大学
	11117 扬州大学

依托学科农业资源与环境对本校环境与生态学科领域进入 ESI 最新排名全球前 1%作出最主要贡献，贡献率为 52%

南京农业大学

ESI 学科主要贡献学科证明

序号	ESI 学科	最主要贡献学科	贡献度
1	农业科学%o	食品科学与工程	34%
2	植物与动物学%o	植物保护	23%
3	生物学与生物化学%	现代园艺科学	35%
4	环境与生态%	农业资源与环境	52%
5	微生物%	兽医学	34%
6	工程%	农业信息学	41%
7	分子生物学与遗传学%	作物学	33%

备注：表格数据统计截至 **2017** 年 **4** 月。

国家科学技术进步奖

证　书

为表彰国家科学技术进步奖获得者，特颁发此证书。

项目名称：有机肥作用机制和产业化关键技术研究与推广

奖励等级：二等

获 奖 者：南京农业大学

中华人民共和国国务院

2015年12月16日

证书号：2015-J-25101-2-08-D01

中华农业科技奖

证书

为表彰在我国农业科学技术进步工作中做出突出贡献的获奖者，特颁发此证书，以资鼓励。

成果名称：有机肥与土壤微生物创新团队

奖励等级：优秀创新团队奖（等同于科研成果一等奖）

获 奖 者：南京农业大学（第1完成单位）

证书编号：TD2015-D-024-01

2015年9月18日

农业部科技发展中心文件

农科项目〔2017〕87号

关于国家重点研发计划“农业面源和重金属污染农田综合防治与修复技术研发”重点专项2017年度项目立项的通知

南京农业大学：

国家重点研发计划“农业面源和重金属污染农田综合防治与修复技术研发”重点专项2017年度项目立项工作已经完成，具体立项情况详见附件。

请根据《关于改进加强中央财政科研项目和资金管理的若干意见》（国发〔2014〕11号）、《关于深化中央财政科技计划（专项、基金等）管理改革的方案》（国发〔2014〕64号）、《科技部 财政部关于印发<国家重点研发计划管理暂行办法>的通知》（国科发资〔2017〕152号）、《财政部 科技部关于印发<国家重点研发计划资金管理办法>的通知》（财科教〔2016〕113号）及项目实施期间出台的国家重点研发计划管理有关规章制度的要求，认真落实项目（课

题）承担单位法人责任，做好项目实施和资金管理使用工作；项目牵头单位和负责人要切实加强课题之间的衔接与协调，确保项目的研究开发目标和任务按期完成；严格按照中央财政科研经费管理的有关规定，资金专款专用，提高资金使用效益。

特此通知。

附件：1. 国家重点研发计划“农业面源和重金属污染农田综合防治与修复技术研发”重点专项2017年度项目立项表

2. “农业废弃物资源化利用机制”项目的立项批复内容

农业部科技发展中心

2017年8月1日

附件 1

国家重点研发计划"农业面源和重金属污染农田综合防治与修复技术研发"重点专项 2017 年度项目立项表

序号	项目编号	项目名称	项目牵头单位
2	2017YFD0800200	农业废弃物资源化利用机制	南京农业大学

附件 2

"农业废弃物资源化利用机制"项目的立项批复内容

一、项目名称（编号）：农业废弃物资源化利用机制（2017YFD0800200）

二、项目牵头承担单位：南京农业大学，项目负责人：徐阳春

三、项目执行年限：2017 年 7 月--2020 年 12 月

四、项目总经费：2300.00 万元，其中中央财政经费 2300.00 万元

五、项目目标和主要考核指标

项目目标：针对我国农业废弃物资源化利用效率低下、污染严重等问题，开展农业废弃物资源化利用基础理论研究，揭示农业废弃物生物转化与降解过程中污染物质流失机制，提出农业废弃物快速降解和无害化的调控途径及其资源化利用的技术策略，为实现"一控两减三基本"提供理论和技术支撑。在农业废弃物处理菌剂复配、生物转化过程中微生物群落演替及其与无害化的关系研究方面达到国际领先水平，整体提升我国农业废弃物资源化利用的理论和技术水平，为实现专项目标中提出的"使我国农业有机废弃物无害化消纳利用率达到 95%"的目标提供理论支持。

主要考核指标：

农业部文件

农财发〔2015〕13号

农业部关于下达公益性行业（农业）科研专项经费2015年立项项目总预算的通知

南京农业大学

根据《财政部关于批复2015年度公益性行业科研专项经费项目总预算的通知》（财教〔2015〕16号），现核定你单位公益性行业（农业）科研专项经费2015年立项项目总预算4533万元（详见附件），并就有关事项通知如下。

一、此次项目总预算的批复不调整你单位2015年收支预算。第一承担单位应将各协作单位在项目实施期间的总预算及各支出科目的经费总额度，以书面形式及时通知各协作单位，并按我部科技教育司有关要求，根据核定的项目总预算及时签订任务书。

— 1 —

〔2014〕11号)《公益性行业科研专项经费管理试行办法》(财教〔2006〕219号)和《财政部 科技部关于调整国家科技计划和公益性行业科研专项经费管理办法若干规定的通知》(财教〔2011〕434号),尽快启动实施项目,切实加强经费管理,加快预算执行进度,提高资金使用效益。公益性行业(农业)科研专项已纳入中央财政科技计划(专项、基金等)管理改革范围,届时请根据管理改革要求做好相关工作。

附件:2015年度公益性行业(农业)科研专项经费项目总预算表

农业部

2015年5月14日

2015年度公益性行业科研专项经费项目总预算表（农业）

单位：万元

项目编号	项目名称	项目承担单位及协作单位	总预算经费																
			小计	设备费	购置设备费	试制设备费	设备改造与租赁费	材料费	测试化验费	燃料动力费	差旅费	会议费	国际合作与交流费	出版/文献/信息传播/知识产权事务费	劳务费	专家咨询费	其他	间接费用	绩效
合计			4533	213	175.00	9.00	29.00	1157	456	212	542	173	74	195	674	94	229	514	192
201503110	作物枯萎病综合治理技术方案		2370	84	64.00	2.00	18.00	690	245	118	279	87	41	83	361	34	80	268	102
		南京农业大学	390	0	0.00	0.00	0.00	50	70	11	55	37	11	20	67	3	11	55	
		福建省农科院农业生物资源研究所	146	8	3.00	0.00	5.00	43	4	7	22	5	0	6	27	3	6	15	
		广东省农业科学院蔬菜研究所	146	6	5.00	0.00	1.00	45	12	13	12	2	3	6	27	0	5	15	
		河南农业大学	156	7	7.00	0.00	0.00	48	19	7	12	3	3	6	20	3	11	17	
		黑龙江省农业科学院园艺分院	157	3	3.00	0.00	0.00	67	15	4	17	2	7	2	19	1	3	17	
		湖南省农业科学院	156	5	5.00	0.00	0.00	56	18	10	13	3	0	4	25	2	3	17	
		江西省农业科学院园艺研究所	147	8	8.00	0.00	0.00	45	15	7	15	3	4	5	22	2	6	15	
		金华职业技术学院	160	10	0.00	0.00	10.00	59	16	1	14	6	4	3	22	2	6	17	
		宁夏农林科学院	143	7	7.00	0.00	0.00	46	6	12	25	5	0	6	18	3	0	15	
		山东农业大学	150	6	4.00	0.00	2.00	44	18	7	15	5	3	5	20	3	7	17	
		沈阳农业大学	157	9	9.00	0.00	0.00	40	20	10	13	4	3	7	24	4	6	17	
		浙江省农业科学院	155	7	5.00	2.00	0.00	43	20	8	24	4	0	4	22	2	4	17	
		中国农业大学	152	6	6.00	0.00	0.00	54	7	11	18	3	3	5	18	3	7	17	
		中国热带农业科学院海口实验站	155	2	2.00	0.00	0.00	50	5	10	24	5	0	4	30	3	5	17	
201503121	旱地两熟区耕地培肥与合理农作制		2163	129	111.00	7.00	11.00	467	211	94	263	86	33	112	313	60	149	246	90
		南京农业大学	378	23	23.00	0.00	0.00	78	40	14	37	20	8	15	76	6	19	42	
		安徽农业大学	170	27	18.00	0.00	9.00	45	7	5	18	10	0	6	28	7	0	17	
		北京市土肥工作站	149	0	0.00	0.00	0.00	52	19	2	13	7	0	10	13	4	12	17	
		农业部环境保护科研监测所	143	0	0.00	0.00	0.00	40	9	9	11	4	0	5	21	2	25	17	
		山东农业大学	140	17	17.00	0.00	0.00	30	8	8	12	4	4	12	18	4	12	17	
		山东省农业科学院农业资源与环境研究所	148	11	4.00	7.00	0.00	19	12	9	22	7	10	6	18	9	8	17	
		山西农业大学	132	7	5.00	0.00	2.00	42	6	6	17	3	0	4	21	1	8	17	
		四川省农业科学院土壤肥料研究所	148	0	0.00	0.00	0.00	31	21	7	22	5	0	14	19	4	8	17	
		西北农林科技大学	139	15	15.00	0.00	0.00	31	15	4	13	6	2	5	18	6	7	17	
		云南省农业科学院农业环境资源研究所	149	1	1.00	0.00	0.00	35	9	9	33	3	0	8	18	3	12	17	
		中国农业大学	177	9	9.00	0.00	0.00	20	27	9	30	4	0	9	33	5	14	17	
		中国农业科学院棉花研究所	156	16	16.00	0.00	0.00	29	18	7	17	6	6	12	17	5	6	17	
		中国农业科学院农业资源与农业区划研究所	129	3	3.00	0.00	0.00	15	20	5	18	7	3	6	13	4	18	17	

国家自然科学基金委员会

资助项目批准通知

国科金计项〔2012〕87号

南京农业大学（单号：2012-87-0202）：

根据《国家自然科学基金条例》有关规定，经专家评审，国家自然科学基金委员会（以下简称自然科学基金委）决定批准资助你单位2012年度（第二批）国家自然科学基金项目7项，金额864万元。其中，国际（地区）合作与交流项目2项，国家杰出青年科学基金2项，国家重大科研仪器设备研制专项（部委推荐）0项；联合基金项目0项，重大项目（课题）1项，重大研究计划0项，专项基金项目2项。上述资助项目清单详见附件。

自自然科学基金委相关科学部电子邮件发送之日起25天内，依托单位和项目负责人须按要求完成电子及纸质《国家自然科学基金资助项目研究计划书》（以下简称计划书）填写、提交与报送等工作。计划书电子文件通过科学基金网络信息系统（https://isis.nsfc.gov.cn）经依托单位确认后提交；计划书纸质文件（一式两份）经依托单位审核并加盖单位公章后报送至自然科学基金委相关科学部。

如在规定期限内未提交和报送电子与纸质计划书的，视为自动放弃接受资助。

附件：2012 年度国家自然科学基金资助项目清单

国家自然科学基金委员会
2012 年 11 月 1[illegible] 日

2012年度国家自然科学基金资助项目清单

南京农业大学（单号：2012-87-0202）

资助项目合计：7项，经费合计：864万元。　　　　共 1 页/第 1 页

序号	项目类型	项目批准号	申请代码1	项目名称	项目负责人	起止年月	资助金额（万元）
1	重大项目	31290213	C1305	新形成多倍体小麦生物量和籽粒性状的表观遗传调控机理	陈增建	2013.1 - 2017.12	450
2	国家杰出青年科学基金	31225022	C1401	植物卵菌病害	王源超	2013.1 - 2016.12	200
3	国家杰出青年科学基金	41225003	D010504	土壤碳氮循环与全球变化	邹建文	2013.1 - 2016.12	200
4	国际(地区)合作与交流项目	31210303068	C150103	国际果树组学和生物技术研讨会	高志红	2012.10 - 2012.12	5
5	国际(地区)合作与交流项目	71210307029	G0305	全球化时代中国农业的发展与变迁国际研讨会	朱晶	2012.10 - 2012.12	3
6	专项基金项目	11226070	A010205	代数量子群的Yetter-Drinfel''d模范畴与Galois理论的研究	杨涛	2013.1 - 2013.12	3
7	专项基金项目	11226188	A010804	Swift-Hohenberg方程的斑图动力学	肖庆坤	2013.1 - 2013.12	3
合计							864

重大专项项目承诺书

项目编号	KYTZ201404	项目负责人	邹建文
项目名称	酸性土壤资源高效利用的生物学机制研究		
资助额（万元）	200+200	起止时间	2014.01.01—2017.12.31.

研究内容：

深入认识酸性土壤肥力提升、养分高效利用与环境安全的微生物生态学与分子生物学机制，构建与调控提高酸性土壤肥力与养分高效利用的微生物区系及微生物学过程，为提升我国酸性土壤肥力、提高养分资源利用效率提供理论依据和科学支撑；挖掘一批磷钾高效利用以及降低铝镉等重金属环境风险的关键调控因子与结构基因，创制酸性土壤磷钾养分高效利用、降低铝镉等重金属环境风险的优异种质材料，为培育养分高效和环境安全的农作物新品种提供理论依据、优异基因与种质资源，使我国酸性土壤养分高效和环境安全的农作物新品种培育分子设计理论与方法等方面取得重大突破，为我国酸性土壤农业高产、资源高效利用与环境安全做出不可替代的贡献。同时培养和建立一支高素质的研究队伍。

研究计划：

2014.1-2014.12 依托项目承担单位的野外试验基地，落实试验方案和试验样地，布置试验小区，采集土壤和植株背景样品，进行相关试验的准备工作和背景数据的测试与分析。

2015.1-2016.12 酸化红壤不同培肥调控措施下的土壤微生物区系组成分析；采用 ^{15}N 稳定同位素示踪结合数值优化模型分析，测定土壤异养硝化、自养硝化、反硝化等关键氮转化过程的初级转化速率和 N_2O 等气体的产生途径和贡献率；完成磷钾高效和低效水稻品种中差异 RNA 表达谱的鉴定工作；筛选到与磷钾吸收利用相关的候选基因或 MicroRNA 3-5 个，筛选到 1 个调控水稻磷钾养分利用的具有重要贡献的新基因；挑选 1-2 份与受体亲本在镉积累上有稳定差异的 SSSLs 与受体亲本杂交构建 F2 作图群体，完成收获 F1 杂交种;挑选 2-3 份与受体亲本在抗铝毒上有稳定差异的 SSSLs 与受体亲本杂交构建 F2 作图群

体，完成收获F1杂交种；土壤生境（理化性质）和生物群落特征的评价；自然干湿交替条件下长期施肥对土壤生态功能稳定性测定；土壤生境、生物群落与土壤生态系统功能稳定性。

2016.1-2016.12 酸性红壤不同快速培肥措施的土壤熟化水平比较及土壤微生物区系分析；提取土壤DNA，分析驱动土壤碳氮转化过程的功能微生物（氨氧化细菌/古菌、反硝化细菌等）群落的结构组成和数量变化；完成水稻磷钾高效和低效品种差异表达蛋白质的质谱鉴定工作，鉴定到在根系、叶片或维管束高效特异性表达的启动子累计2-3个，控制磷钾吸收转运的转录因子3-4；验证候选功能基因累计4-6个，筛选2-3个对水稻磷钾营养状况具有明显改善作用的新基因；筛选出低镉积累SSSLs，选育出低镉积累品系；完成低镉积累SSSLs F2作图群体的构建，通过分子标记连锁分析，初步定位目的QTLs；完成具有抗铝毒差异SSSLs F2作图群体的构建，并对F2单株进行抗铝毒表型分析和分子标记连锁分析，初步定位抗铝毒QTLs；分析长期施肥影响的土壤在模拟干扰下土壤功能稳定性的变化；不同化肥和有机物对模拟干扰下土壤功能稳定性的影响；接入土壤生物对模拟干扰下土壤功能稳定性的影响。

2017.1-2017.12 酸化红壤不同培肥调控措施下的土壤微生物功能基因组分析及其与土壤肥力和微生物区系组成的耦合；同步开展酸性土壤典型生态系统不同种植模式下的综合温室效应、净温室效应及温室气体强度评估研究；解析水稻磷钾养分吸收利用过程中激素和MicroRNA的关键调控作用，提出利用植物激素和MicroRNA调控途径中关键基因改良水稻磷钾养分的新策略。创制出高效利用酸性红壤低磷钾养分、具有育种价值的水稻转基因新材料2-3份；对低镉积累QTLs进行精细定位，结合转基因互补实验最终克隆出低镉QTL;对抗铝毒QTLs进行精细定位，结合转基因互补实验最终克隆出抗铝毒QTL;对克隆出低镉或抗铝毒QTLs进行功能分析；基于长期施肥土壤的置换试验研究土壤生物群落对功能稳定性的影响；土壤生境（理化性质）及生物群落的交互作用对功能稳定性的影响；分析土壤生态功能稳定性的直接和间接影响因素，建立有机物作用下土壤生态功能稳定性变化的模型。

考核指标：

（1）发表本领域主流SCI期刊论文15~20篇；

（2）申请发明专利 5-8 项，水稻转基因新材料新品系 2-3 个； （3）培养博士生 15 名，硕士生 30 名； （4）培养基金委"优青"和教育部"新世纪优秀人才"2-3 名； （5）形成一支土壤资源高效利用的生物学基础研究团队，力争成为省部级创新团队。 本项目研究产出成果产权单位为南京农业大学，且项目主持人/项目团队成员须为公开发表论文的第一或通讯作者。 科研院（章）： 年 月 日
项目主持人承诺： 我接受南京农业大学中央高校基本科研业务费专项资金项目资助。认真遵守财政部、教育部《中央高校基本科研业务费专项资金管理暂行办法》、《南京农业大学基本科研业务费管理暂行办法》，认真开展研究工作；按时报送有关材料，及时报告重大情况变动；对资助项目产生成果（包括论文、专著、技术文件、专利等）标注项目编号（资助排序前三位）和"中央高校基本科研业务费专项资金资助"，英文（Supported by"the Fundamental Research Funds for the Central Universities"）。同时本人/项目团队成员为公开发表论文的第一或通讯作者。 项目负责人（签名）： 2014年 12月 1 日
依托单位承诺： 我单位同意承担上述中央高校基本科研业务费专项资金项目，将保证项目负责人及其研究队伍的稳定和研究项目实施所需的条件，严格遵守南京农业大学有关资助项目管理、财务等各项规定，并督促实施。 单位（盖章） 2014年 12月 1 日

科学技术部文件

国科发资〔2015〕128号

科技部关于拨付2015年度第三批国家重点基础研究发展计划（973计划）课题专项经费的通知

南京农业大学（邹建文，课题负责人）

你单位承担的国家重点基础研究发展计划（973计划）课题批复专项经费 264 万元，根据国家科技计划专项经费支付进度安排，本次拨付 147 万元（详见附件）。

请你单位及课题负责人按照《国务院关于改进加强中央财政科研项目和资金管理的若干意见》（国发〔2014〕11号）、《关于调整国家科技计划和公益性行业科研专项经费管理办法若干规定的通知》（财教〔2011〕434号）和《国家重点基础研究发展计划

专项经费管理办法》（财教〔2006〕159号）等有关规定要求，单独核算、专款专用，加强课题经费管理，提高经费使用效益。

附件：国家重点基础研究发展计划（973计划）课题专项经费预算安排表

科技部

2015年4月27日

（此件依申请公开）

科学技术部办公厅　　2015年4月30日印发

科学技术部文件

国科发资〔2017〕106号

科技部关于拨付2017年度国家重点基础研究发展计划（973计划）课题专项经费的通知

南京农业大学（邹建文 课题负责人）

你单位承担的国家重点基础研究发展计划（973计划）课题批复专项经费 260 万元。根据国家科技计划专项经费支付进度安排，本次拨付 260 万元（详见附件）。

请你单位及课题负责人按照《国务院关于改进加强中央财政科研项目和资金管理的若干意见》（国发[2014]11号）、《关于调整国家科技计划和公益性行业科研专项经费管理办法若干规定的通知》（财教[2011]434号）和《国家重点基础研究发展计划专项

经费管理办法》（财教[2006]159号）等有关规定要求，单独核算、专款专用，加强课题经费管理，提高经费使用效益。

附件：国家重点基础研究发展计划（973计划）课题专项经费预算安排表

中华人民共和国科学技术部

2017年4月24日

（此件依申请公开）

科学技术部办公厅	2017年4月25日印发

国家重点基础研究发展计划（973计划）经费预算安排表

单位：万元

项目编号：2015CB150500	项目名称：作物高产高效的土壤微生物区系特征及其调控	
课题编号：2015CB150502	课题名称：水旱轮作土壤微生物区系交替演变特征与稻田氮素高效利用研究	
课题承担单位：南京农业大学		课题负责人：邹建文
科目名称	预算批复数	备注
一、专项经费支出预算合计	260.00	
(一)、专项直接费用合计	230.96	
1、设备费	9.36	
2、材料费	42.74	
3、测试化验加工费	33.20	
4、燃料动力费	4.05	
5、差旅费	79.08	
6、会议费		
7、国际合作与交流费		
8、出版/文献/信息传播/知识产权事务费	6.90	
9、劳务费	43.20	
10、专家咨询费	2.04	
11、其他支出	10.39	
(二)、专项间接费用合计	29.04	
绩效支出	19.73	
二、来源预算合计	260.00	
(一)、申请从专项经费获得的资助	260.00	
(二)、自筹经费来源		
1、其他财政拨款		
2、单位自有货币资金		
3、其他资金		
三、专项经费本年拨付数	260.00	

21001412--94-6

国家自然科学基金资助项目批准通知

南京农业大学　邹建文同志：

根据《国家自然科学基金条例》的规定和专家评审意见，国家自然科学基金委员会决定资助您的申请项目。请您登录科学基金项目管理 ISIS 网络信息系统（https://isis.nsfc.gov.cn），获取《国家自然科学基金资助项目研究计划书》（以下简称计划书）。您登录该系统的用户名和密码已通过电子邮件方式发送至您在申请书中填写的电子邮箱。

请您按照本通知的研究期限、资助金额和修改意见填写计划书，要求纸质原件（一式两份）和电子文档同时报送（请保证电子文档和纸质文件内容一致）。电子文档由申请人上传到科学基金网络信息系统（https://isis.nsfc.gov.cn），或用电子邮件发送到：report@pro.nsfc.gov.cn 信箱， 电子文档报送截止日期为 9 月 12 日 ；纸质原件送所在单位审核盖章后，由依托单位在 9 月 12 日前统一报送。

如对批准意见有异议，须在上述电子文档报关截止日期前提出；未说明理由逾期不报计划书者，视为自动放弃接受资助。

国家自然科学基金委员会

地球科学部

年 8 月 日

附：批准意见表（见背面）

6

附：批准意见表

项目批准号	41171194	归口管理部门	地球科学部	资助领域分类代码	D010503
项目名称	不同农业生产方式下菜地氧化亚氮排放的观测比较研究				
资助类别	面上项目	亚类说明			
附注说明					
项目负责人	邹建文	依托单位	南京农业大学		
资助金额	75.00 万元	研究期限	2012.01 至 2015.12		
对研究方案的修改意见：					

关于国家自然科学基金资助项目批准及有关事项的通知

邹建文　先生/女士：

根据《国家自然科学基金条例》的规定和专家评审意见，国家自然科学基金委员会（以下简称自然科学基金委）决定批准资助您的申请项目。项目批准号：41771323，项目名称：苏南地区茶园酸性土壤一氧化氮和氧化亚氮排放的同步观测研究，直接费用：63.00万元，项目起止年月：2018年01月至 2021年 12月，有关项目的评审意见及修改意见附后。

请尽早登录科学基金网络信息系统（https://isisn.nsfc.gov.cn），获取《国家自然科学基金资助项目计划书》（以下简称计划书）并按要求填写。对于有修改意见的项目，请按修改意见及时调整计划书相关内容；如对修改意见有异议，须在计划书电子版报送截止日期前提出。**注意：请严格按照《国家自然科学基金资助项目资金管理办法》填写计划书的资金预算表，其中，劳务费、专家咨询费科目所列金额与申请书相比不得调增。**

计划书电子版通过科学基金网络信息系统（https://isisn.nsfc.gov.cn）上传，由依托单位审核后提交至自然科学基金委进行审核。审核未通过者，返回修改后再行提交；审核通过者，打印为计划书纸质版（一式两份，双面打印），由依托单位审核并加盖单位公章后报送至自然科学基金委项目材料接收工作组。计划书电子版和纸质版内容应当保证一致。

向自然科学基金委提交和报送计划书截止时间节点如下：

1、提交计划书电子版截止时间为**2017年9月11日16点**（视为计划书正式提交时间）；

2、提交计划书电子修改版截止时间为**2017年9月18日16点**；

3、报送计划书纸质版截止时间为**2017年9月26日16点**。

请按照以上规定及时提交计划书电子版，并报送计划书纸质版，未说明理由且逾期不报计划书者，视为自动放弃接受资助。

附件：项目评审意见及修改意见表

国家自然科学基金委员会
地球科学部
2017年8月17日

附件：项目评审意见及修改意见表

项目批准号	41771323	项目负责人	邹建文	申请代码1	D010506
项目名称	苏南地区茶园酸性土壤一氧化氮和氧化亚氮排放的同步观测研究				
资助类别	面上项目		亚类说明		
附注说明	常规面上项目				
依托单位	南京农业大学				
直接费用	63.00 万元		起止年月	2018年01月 至 2021年12月	

通讯评审意见：

<1>该项目针对茶园酸性土壤温室气体排放问题，研究其中NO和N_2O的排放规律，对于茶园土壤氮氧化物减排等方面具有明显的意义。

监测分析茶园酸性土壤在不同施肥条件下的NO和N_2O的排放特征，研究NO和N_2O的排放过程及相应的微生物机制所采用的研究方法较为先进，前期所做的研究工作比较扎实。

氮肥种类和施用方式等均可能影响NO和N_2O的排放，建议申请者加强相关方面的研究，以便为茶园酸性土壤精准施肥和氮氧化物排放调控提供支持。

总体而言，项目研究基础好，研究目标明确，技术路线合理。

<2>一氧化氮和氧化亚氮是大气环境活性痕量气体，对全球变化有直接影响，土壤是大气NO和N_2O的重要排放源，二者产生过程相互关联，开展NO和N_2O同步联合观测及其产生机制研究对综合评估其在氮素生物地球化学中相对重要性至关重要。土地利用方式直接影响土壤NO和N_2O的产生与排放，茶园是重要的半自然生态系统，在我国南方分布广泛，目前在茶园生态系统中有关土壤NO和N_2O联合观测及其产生偶联机制研究尚为空白。本项目以苏南地区茶园酸性土壤为研究对象，通过田间原位NO和N_2O排放速率同步联合监测，结合定量PCR技术，研究茶园酸性土壤NO和N_2O排放与土壤碳氮过程关联的微生物学机制，阐明茶园酸性土壤NO和N_2O的排放特征和排放强度，可为深入认识酸性土壤NO和N_2O产生、转化和排放过程提供科学依据，为制定茶园NO和N_2O减排的养分综合管理对策提供数据支持，具有一定的应用价值和现实意义。研究内容设置合理，目标明确，研究思路清晰，技术方案详尽、可行。申请者及其研究团队有扎实的前期研究基础，并有良好的国际交流和合作基础，所在单位有很好的仪器设备支撑平台，为本项目的顺利实施奠定了扎实的基础。建议优先资助。

<3>本项目针对茶园土壤严重酸化、起垄种植和条带状施肥的特点，推测茶园土壤NO 和N_2O 排放特征与排放强度可能显著区别于大田粮食作物系统.体现在：（1）茶园酸性土壤NO 和N_2O 排放强度可能显著高于大田粮食作物系统；（2）起垄种植和条带状施肥带来土壤水分和养分在垄上根际和垄间的分域差异，导致茶园酸性土壤NO 和N_2O 排放可能呈现空间点位分异特征。为此，拟开展茶园酸性土壤氮氧化物排放的周年同步观测研究,揭示茶园土壤NO 和N_2O 排放过程与排放强度区别于大田粮食作物系统的差异性特征。项目针对的问题具体且具有现实意义。项目内容具体，方案翔实，申请人团队工作基础好，在本领域发表过相关众多有影响的文章，有望实现研究目标。

<4>亚热带酸性土壤是NO和N_2O重要排放源，准确估算NO、N_2O的排放系数和驱动机制有助于降低区域氮氧化物排放量的不确定性。本项目以苏南两种茶园土壤为研究对象，根据其生产特点，野外同步监测土壤NO,N_2O通量，利用Baps、Robot系统室内培养技术测定土壤碳氮转化速率，利用抑制剂方法评估细菌、真菌、放线菌反硝化对NO、N_2O排放的贡献，以及利用稳定性氮同位素示踪技术分离NO、N_2O产生途径。总体而言，项目申请者清晰地阐明了该领域的研究现状，指出了当前研究中存在的问题与薄弱环节，针对性地设计了4个研究内容，环环相扣。从排放格局、驱动过程、路径分离、功能微生物群落丰度等方面阐述了土壤NO,NO的产生过程及其驱动机制，内容系统，使用的方法先进合理，有一定的创新性。此外，项目申请者长期从事土壤温室气体通量研究，有很好的研究基础。

<5>本项目拟同步观测茶园酸性土壤一氧化氮和氧化亚氮排放，评估其排放强度和氮肥排放系数，同时分析其微生物驱动机制，研究结果对于降低亚热带酸性土壤一氧化氮和氧化亚氮排放量估算的不确定性具有重要意义，对于制定酸性土壤含氮气体减排对策具有一定的实践指导意

义。本项目科学问题和研究目标明确，研究内容详实，技术路线合理，能够回答提出的关键科学问题。研究团队具有很好的前期工作基础和研究条件。从已经完成的基金项目完成情况看，项目申请人科研能力较强，有能力完成研究目标。建议优先资助。 具体意见： 研究团队人员数量略少，建议申请人适当增加研究人员。 一氧化氮的15N丰度很难直接测定，申请人对此描述过于简单，需要明确的其是否建立了测定/前处理方法或装置。
修改意见： 地球科学部 2017年8月17日

期刊编委任职证明

25 January 2017

JIANWEN ZOU
COLLEGE OF RESOURCE & ENVIRONMENTAL SCIENCES, NANJING AGRICULTURAL UNIVERSITY
1 WEIGANG STREET
NANJING
JIANGSU PROVINCE 210095
CHINA

Re: Heliyon – Editorial Board Member

Dear JIANWEN

It gives me great pleasure to formally confirm our offer to appoint you as an Editorial Board Member ("Board Member") for the Elsevier Limited (the "Publisher") journal "Heliyon" (the "Journal"). Set out below are the terms and conditions that constitute our Agreement under which you will provide Editorial Board Member Services (as defined below) for the Journal, in coordination with the Publisher's Editor in Chief and other Board Members of the Journal, taking into account the Publisher's editorial policies as updated from time to time (including without limitation those on ethics in publishing on the Publisher's website) and the editorial policy of the Journal (together "the Policies"). The following sets out your roles and duties as well as those of the Publisher, and replaces all prior agreements or arrangements.

The Publisher, as the owner of the Journal, will be responsible for and shall decide on all matters connected with the production, publication and dissemination of the Journal, including without limitation pricing or other access arrangements for the Journal.

For the purpose of performing the ad hoc editorial activities occasionally required from time to time under this Agreement you agree to use the Publisher's preferred electronic submission system.

The Journal contains full length research papers ("Articles").

Your role as Editor includes ensuring suitable standards of Articles solely in your specialty area of practice, with responsibility for the acceptance or rejection of Articles assigned to you by the Editor-in-Chief, the appointment of Article reviewers, and efficient, timely and confidential coordination of the process of handling, editing, and refereeing Articles (the "Editorial Services").

You will conduct the Editorial Board Member Services in accordance with generally accepted industry standards for integrity and objectivity and with the Policies.

In selecting Articles for publication, you shall take all reasonable care to avoid publication of Articles that contain material of a libellous, unlawful or otherwise actionable nature, or that may for other reasons infringe any right of others, or cause damage or harm to persons or property or to the Journal's good reputation.

All work produced by you in relation to the Journal and/or for the Publisher pursuant to this Agreement, including without limitation the selection, compilation and/or editing of the material published in the Journal, shall be work-made-for-hire of which the Publisher is author-at-law, and accordingly all rights comprised in the copyright in such work shall belong entirely to the Publisher. To the extent that any of such work is determined not to be work-made-for-hire, you also hereby assign and transfer to the Publisher, to the maximum extent possible, all such right, title and interest as you may have in and to any of such work, the Journal and to any other material produced by you for the Publisher pursuant to this Agreement. You also authorize use of your name, biography, image and professional affiliations (at the Publisher's discretion) for purposes of promoting the Journal.

All editorial material, including, but not limited to emails, received by you in your capacity as board member of the Journal during the term of this Agreement, is intended for and is the confidential property of the Publisher and, if requested by the Publisher, shall be immediately forwarded by you to the Publisher, whether or not such material has been previously reviewed by you.

In order to carry out the purposes of this Agreement and ensure the scientific and commercial success of the Journal, you agree that, during the term of this Agreement, you shall observe the interests of the Journal and abstain from any action that will be detrimental to the Journal. The Publisher's appointment of you as Board Member is predicated on the idea that your personal services are of the essence and that the Publisher shall not be obligated to accept any substitute performance.

As remuneration for the editorial activities performed hereunder, you will receive while you are Board Member one free publication in Heliyon over the term of this Agreement, subject to peer review.

You represent and warrant that you are familiar with all applicable conflict of interest and outside compensation laws and regulations as well as policies and rules of your employer or institution (if applicable), and that your acceptance of this appointment, and the terms of this Agreement and your performance under this Agreement, including your participation in board member conferences, trainings and meetings and acceptance of transportation, hospitality, food and lodging provided by the Publisher to you in connection therewith (if any), are and will be in compliance with those laws, regulations, policies and rules.

To the extent that you perform your duties using such skill and care as required in connection with your obligations hereunder, the Publisher shall indemnify, defend and hold you harmless from and against any costs arising from or out of any third-party claim in connection with the performance of your obligations under this Agreement, unless such third party claim is the result of your wilful misconduct, fraud, or gross negligence. If any third-party claim is made, you will promptly notify the Publisher, which shall have sole authority to appoint counsel to defend the third-party claim and to conduct and control the defense of any such claim. You also agree to reasonably cooperate with the defense of any such claim as reasonably requested by the Publisher.
You shall maintain all Confidential Information (as defined herein) in strict confidence, not disclose any Confidential Information to any third party other than as necessary to perform your obligations set forth in this Agreement, and protect such information with the highest degree of care. For the purposes of this Agreement, "*Confidential Information*" means any business, financial, operational, customer, vendor and other information disclosed by the Publisher to you or received by you in performance of this Agreement and not generally known by or disclosed to the public or known to you solely by reason of the negotiation or performance of this Agreement, and shall include, without limitation, the terms of this Agreement,, market positioning data and emails received by you in your capacity as board member of the Journal.

You will be appointed by the Publisher for a term of three years beginning on 25 January 2017 and concluding on 25 January 2020. However, either you or the Publisher may end the Agreement prior to the end of the term if the other party fails to perform any of its important obligations (as described in this Agreement) and does not rectify such failure within twenty-one (21) days of being notified in writing of such failure.

The Publisher may end this Agreement without cause or if the Publisher decides to cease publication of the Journal or if you cease to be professionally active upon three (3) months' written notice. The Publisher may also end this Agreement on written notice to you if you are unable for any reason to continue your responsibilities for the Journal for a period of three (3) months or more or if you commit a criminal act or otherwise act in a manner likely to bring the Publisher or the Journal into disrepute. Any termination of this Agreement by the Publisher shall be with no further obligation to you.

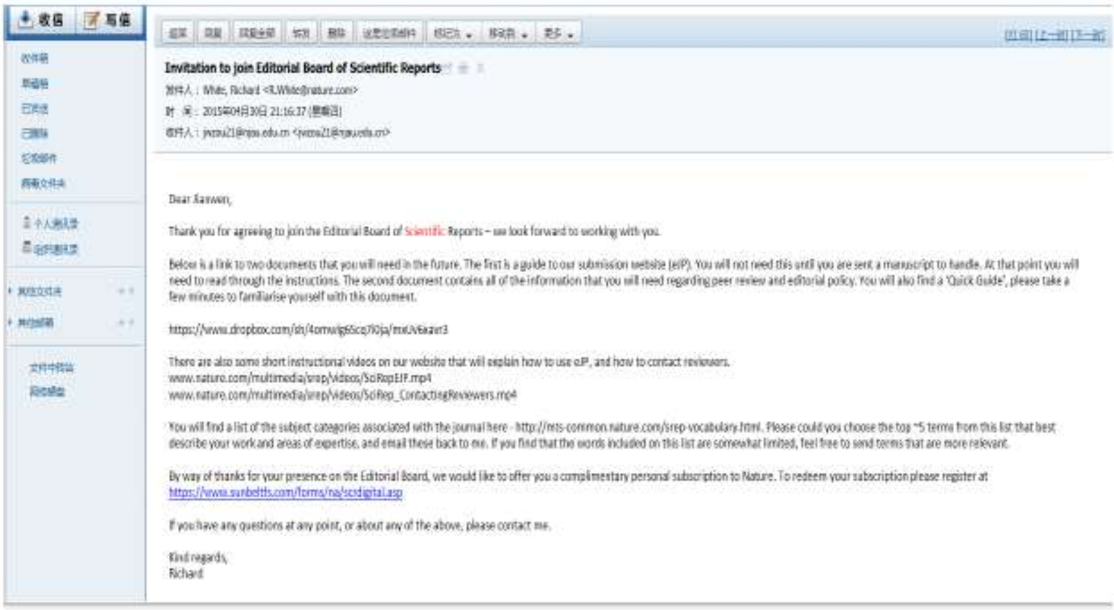
On expiration or termination of this Agreement, you will give the Publisher all necessary information and assistance to facilitate the undisturbed and continued publication of the Journal (including all files

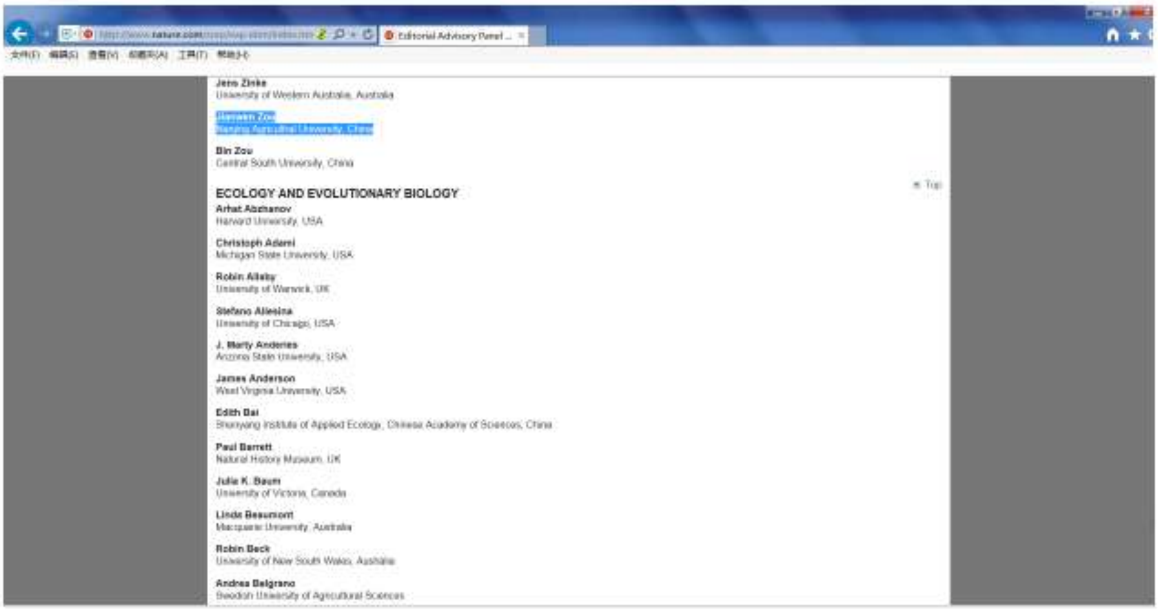
(print and electronic), correspondence and work in progress on future issues of the Journal) and to maintain good relationships with authors, referees and other members of the Editorial Board and you shall generally handle the transition to the incoming editor in a seamless and professional manner.

The Publisher may, without your prior written consent, assign this Agreement.

This Agreement shall be governed and interpreted according to the laws of the corporate domicile of the Publisher and the parties submit to the exclusive jurisdiction of the courts of that corporate domicile.

✓ I have read and agree to the terms of this Editorial Board Member Agreement.


Invitation to join Editorial Board of Scientific Reports
White, Richard <R.White@nature.com>
2015年04月30日 21:16:37
Dear Jianwen,
Thank you for agreeing to join the Editorial Board of Scientific Reports – we look forward to working with you.
Below is a link to two documents that you will need in the future. The first is a guide to our submission website (eJP). You will not need this until you are sent a manuscript to handle. At that point you will need to read through the instructions. The second document contains all of the information that you will need regarding peer review and editorial policy. You will also find a 'Quick Guide', please take a few minutes to familiarise yourself with this document.
There are also some short instructional videos on our website that will explain how to use eJP, and how to contact reviewers.
www.nature.com/multimedia/srep/videos/SciRepEJP.mp4
www.nature.com/multimedia/srep/videos/SciRep_ContactingReviewers.mp4
You will find a list of the subject categories associated with the journal here - http://mts-common.nature.com/srep-vocabulary.html. Please could you choose the top ~5 terms from this list that best describe your work and areas of expertise, and email these back to me. If you find that the words included on this list are somewhat limited, feel free to send terms that are more relevant.
By way of thanks for your presence on the Editorial Board, we would like to offer you a complimentary personal subscription to Nature. To redeem your subscription please register at
https://www.sunbelts.com/forms/na/scidigital.asp
If you have any questions at any point, or about any of the above, please contact me.
Kind regards,
Richard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聘 书

兹聘请郑建文教授为《资源科学》第八届编辑委员会委员，任期 5 年。

中国科学院地理科学与资源研究所
中国自然资源学会
2015年1月

教育部司局函件

教技委〔2016〕1号

教育部科学技术委员会关于聘任第七届教育部科学技术委员会学部委员的通知

有关高等学校：

根据《教育部关于聘任第七届教育部科学技术委员会委员的通知》(教技函〔2016〕18号)要求，在有关高校推荐的基础上，教育部科技司各相关处结合工作职能精心遴选，第七届教育部科学技术委员会（以下简称"科技委"）主任办公会讨论通过，科技委学部及其组成人员名单已经确定，学部委员共381名，现予以公布（见附件）。

科技委设13个学部，即数理学部、化学化工学部、地学与资源学部、生物与医学学部、农林学部、环境与土木水利学部、材料学部、信息学部、先进制造学部、能源与交通学部、管理学部、国际合作学部、国防科技学部。

每个学部设主任委员1名，常务副主任委员1名，副主任委员3名。

科技委委员按相关学科领域进入学部，参加学部活动，履行学部委员职责。

各学部与教育部科技司各处建立对口联系机制，数理学部、化学化工学部、地学与资源学部、生物与医学学部、农林学部、环境与土木水利学部由基础处负责联系；材料学部、信息学部、先进制造学部、能源与交通学部由高新处负责联系；管理学部、国际合作学部由综合处负责联系；国防科技学部由军工处负责联系；科技委秘书处负责统筹协调。

希望有关单位积极支持科技委工作，为各位学部委员充分发挥作用提供有力支持。希望各位学部委员切实履行工作职责，为建设高等教育强国，深入实施创新驱动发展战略，建设创新型国家作出更大贡献。

附件：第七届教育部科学技术委员会学部及其组成人员名单

教育部科学技术委员会

2016年5月4日

2

30	委员	顾　宁	男	东南大学
31	委员	徐瑞华	男	中山大学
32	委员	葛均波	男	复旦大学
33	委员	雷　寒	男	重庆医科大学
34	委员	裴　钢	男	同济大学
35	委员	樊代明	男	第四军医大学
36	委员	樊瑜波	男	北京航空航天大学
37	委员	颜光美	男	中山大学

（五）农林学部（共 30 人）

序号	学部任职	姓名	性别	单位名称
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2	常务副主任	李德发	男	中国农业大学
3	副主任	陈　坚	男	江南大学
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12	委员	吴普特	男	西北农林科技大学
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15	委员	张启翔	男	北京林业大学
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17	委员	张宪省	男	山东农业大学
18	委员	张福锁	男	中国农业大学
19	委员	陈昆松	男	浙江大学
20	委员	陈焕春	男	华中农业大学

聘 书

邹建文 先生：

您被聘为中国土壤学会第十二届理事会青年工作委员会主任，任期四年。

中国土壤学会

2012年8月

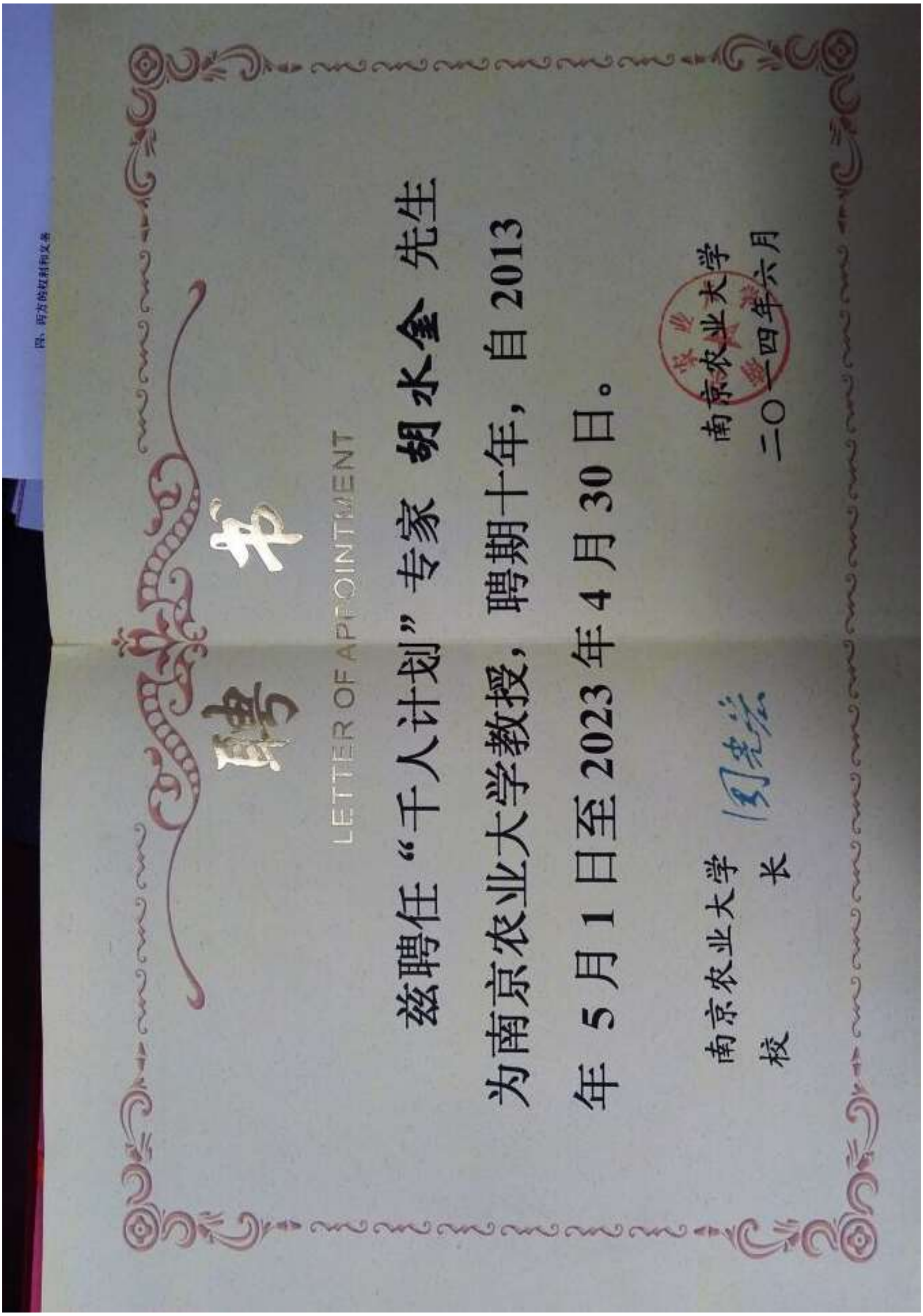
聘书

邹建文 先生：

您被聘为中国土壤学会第十三届理事会青年工作委员会主任，任期四年。

中国土壤学会

2016年9月


聘书
LETTER OF APPOINTMENT
兹聘任"千人计划"专家 胡水金 先生
为南京农业大学教授，聘期十年，自2013
年5月1日至2023年4月30日。
南京农业大学
校　　长
南京农业大学
二〇一四年六月

姓名/Name 胡水金

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Organization Department of CCCPC

人力资源和社会保障部

Ministry of Human Resources and Social Security

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中国共产党中央委员会组织部

中华人民共和国人力资源和社会保障部

"国家特聘专家"，是国家为海外高层次引进人才设立的最高荣誉称号。

"State Specially Recruited Experts" is the highest title of honor established by the state for the high level experts introduced from overseas.

证书

南京农业大学 邹建文：

入选为创新人才推进计划中青年科技创新领军人才，特发此证。

第 2014RA2151 号

中华人民共和国科学技术部

2015 年 2 月 26 日

中共中央组织部办公厅文件

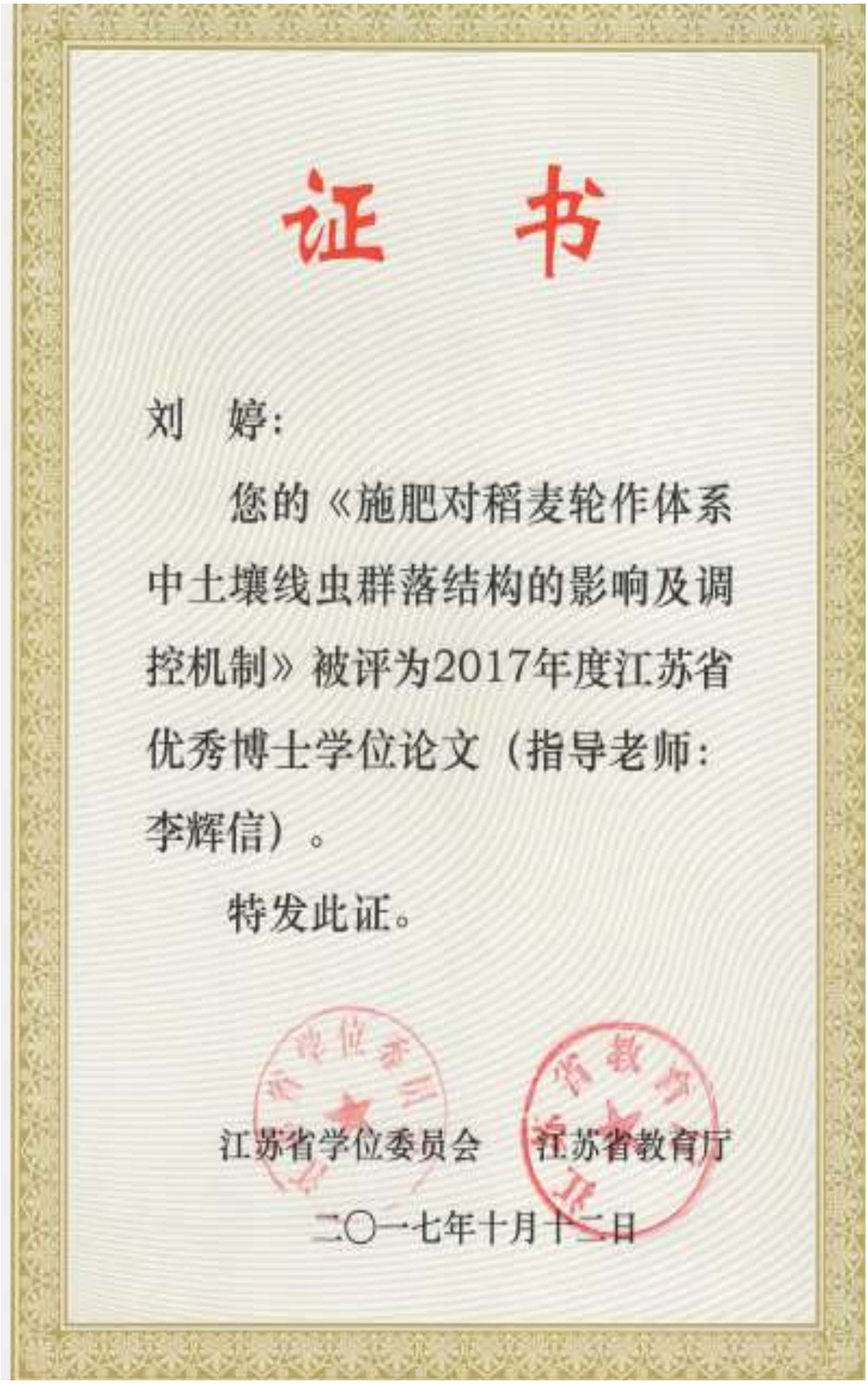
组厅字〔2016〕37号

中共中央组织部办公厅关于印发第二批国家“万人计划”领军人才入选名单的通知

各省、自治区、直辖市党委组织部，各副省级城市党委组织部，中央和国家机关各部委、各人民团体组织人事部门，新疆生产建设兵团党委组织部，各中管金融企业党委，部分国有重要骨干企业党组（党委），部分高等学校党委：

第二批国家“万人计划”科技创新领军人才、科技创业领军人才、哲学社会科学领军人才、教学名师和百千万工程领军人才入选名单已经专家组评审并报中央领导同志同意，现印发给你们。请按照申报渠道，及时通知入选者所在单位和本

姓　名	工作单位
肖　睿	东南大学
吴　刚	东南大学
张古雄	中国矿业大学
张　农	中国矿业大学
曹亦俊	中国矿业大学
王　媛	河海大学
苏怀智	河海大学
刘元法	江南大学
吴　敬	江南大学
胥传来	江南大学
丁艳锋	南京农业大学
李　艳	南京农业大学
邹建文	南京农业大学
娄　东	南京农业大学
马忠华	浙江大学
王　鹏	浙江大学
王福俤	浙江大学
计　剑	浙江大学
叶　娟	浙江大学
刘东红	浙江大学
苏宏业	浙江大学



证　书

刘　婷：

您的《施肥对稻麦轮作体系中土壤线虫群落结构的影响及调控机制》被评为2017年度江苏省优秀博士学位论文（指导老师：李辉信）。

特发此证。

江苏省学位委员会　　江苏省教育厅

二〇一七年十月十二日

证 书

王 敏：

您的《土传黄瓜枯萎病致病生理机制及其与氮素营养关系研究》被评为2015年度江苏省优秀博士学位论文（指导老师：郭世伟）。

特发此证

江苏省学位委员会

2015年9月18日

编号：JSXW20151048

项目编号：

技术 开发 合同

（开发/转让/咨询/服务）

项目名称：零污染资源化利用废弃畜禽关键技术开发

甲　　方：江苏绿汇宿动实业有限公司

乙　　方 1：南京农业大学

乙　　方 2：江苏中宜生物肥料工程中心有限公司

签订时间：2014 年 9 月 26 日

签订地点：南京农业大学

有效期限：2014 年 9 月 26 日 至 2017 年 9 月 25 日

中华人民共和国科学技术部制

3、合同生效1年内，双方成功建立年处理1000吨废弃畜禽的生产线2条，建立在两个基地，每个基地1条，获得大规模动态连续发酵工艺参数以及技术的优化集成。

4、合同生效1年半内，获得叶面肥登记证。

5、合同生效2年内，获得生物柴油的生产工艺。

6、合同生效3年内，获得叶面肥在1-2种植物上的最佳施用量与施用方法、增产效果以及对农产品品质的影响。

五、技术情报和资料的保密：

双方都必须严守情报和资料的技术秘密，甲方有对“废弃畜禽无害化处理工艺技术；氨基酸水溶肥（叶面肥和冲施肥）生产工艺技术”进行保密的责任和义务；乙方对甲方的经营生产商业行为进行保密。如有泄密，则按以下第_1_种方式承担责任

1、按合同金额的2倍支付违约金。

2、按给对方造成的实际损失额赔偿。

六、风险责任的承担：

乙方应保证本项技术的实用性、可靠性，并保证本项技术秘密不侵犯任何第三方的合法权益。

七、技术秘密的后继改进

后继改进成果按以下第_1_种方式执行

（1）乙方后继改进成果甲方优先优惠使用。

（2）后继改进成果属后继改进方的原则执行。

八、价款、报酬或者使用费的支付方式：

1、双方约定由甲方向_乙_方支付技术（转让/开发/咨询/服务）费人民币_壹佰万元（1000000.00元）整。即分别支付给乙方1伍拾万元（500000.00元）整和乙方2伍拾万元（500000.00元）整。

2、支付方式：（一次、分期、入门费加提成）

（1）在本合同签订15天内，甲方向乙方支付合同金额的30%，即人民币叁拾万元（300000.00元）整；

（2）合同约定的第一条生产线完工后支付合同金额的 20%计人民币 贰拾万元（200000.00 元）整；

（3）帮助企业拿到氨基酸水溶肥肥料登记证后支付合同金额的 30%计人民币叁拾万元（300000.00 元）整；

（4）工程完工，产品质量验收合格，合同到期之前甲方向乙方支付余下的 20%计人民币贰拾万元（200000.00 元）整；

3、甲乙双方约定，甲方利用乙方本工艺技术建设第三条及以上处理和生产线时甲方须支付给乙方 20 万元/条生产线，支付时间为生产线启动建设时支付 10 万元，建设完成后支付 10 万元，建设时间不得超过 1 年。

九、技术服务和技术指导：

1、内容：

（1）乙方向甲方提供废弃畜禽无害化处理和资源化利用工艺流程和技术，帮助甲方设计生产车间等，协助甲方就酸解处理所需的设备的选型和定型，以及产品指标测定所需的仪器设备选型。

（2）乙方对甲方技术人员 2 名进行培训，使甲方技术人员学会工厂化生产技术，肥料产品中氮磷钾、有机质、水分、pH、氨基酸等各种指标的测定和判读，帮助甲方培养 2 名技术管理人员，并帮助甲方建设产品指标测定的化验室。

（3）乙方协助甲方完成本技术产品的企业标准、企业标准编制说明及有机肥产品报告，并通过省级技术监督部门的审查备案。

（4）乙方协助甲方做好所生产的氨基酸水溶肥产品营销的宣传工作。

2、方式：乙方派技术人员到甲方现场技术服务，直到甲方技术人员学会为止。

十、验收标准和方法：

甲 方（技术需方）：江苏绿汇宿动实业有限公司（盖章）

法定代表人/委托代理人（签字）

年 月 日

项目负责人：（签字）

2014年 9 月26日

乙 方1（技术供方）：南京农业大学（盖章）

法定代表人/委托代理人（签字）

2014年 9 月26日

项目负责人：（签字）

年 月 日

乙 方2（技术供方）：江苏中宜生物肥料工程中心有限公司（盖章）

法定代表人/委托代理人（签字）

2014年 9 月26日

项目负责人：（签字）

年 月 日

农业部办公厅文件

农办科〔2017〕24号

农业部办公厅关于推介发布秸秆农用十大模式的通知

各省、自治区、直辖市农业(农牧、农村经济)厅(局、委),新疆生产建设兵团农业局,黑龙江省农垦总局:

为贯彻落实中央绿色发展要求,打好农业面源污染防治攻坚战,促进农作物秸秆综合利用,我部组织遴选了秸秆农用十大模式,现予推介发布。

请各地农业行政主管部门高度重视,加大成熟适用的秸秆综合利用模式推广力度。要依托国家现代农业产业技术体系和基层农技推广体系,组织专家和农技人员集中开展培训,引导农民科学开展秸秆综合利用工作,促进秸秆农用模式进村、入户、到场、到

田。要充分利用电视、广播、报刊、网络等媒体进行广泛宣传，营造广大农民学模式用模式的良好社会氛围。

农业部办公厅

2017年4月27日

秸秆农用十大模式

一、东北高寒区玉米秸秆深翻养地模式

（一）模式内涵

东北地区玉米秸秆产量十分丰富，约占全国秸秆量的30%以上。由于冬季气温低，玉米秸秆在地表难以有效腐解，因此深翻还田成为秸秆处理的重要途径。该模式基于东北地区玉米生产所处的气候与生态条件，以"深翻还田"为核心，通过促进农机农艺技术的融合，凸显出秸秆还田对黑土地资源保护的生态效益。在该模式下，联合收割机收割玉米后，将玉米秸秆粉碎均匀抛洒地面，然后用重型拖拉机深翻还田，在春季进行耙平，开展下一季农事生产。

（二）模式特点

1. 针对东北黑土地"质退量减"的现状，秸秆深翻还田可以实现深层土壤增碳的效果，构建黑土地合理耕层，提高土壤有机质含量。

2. 秸秆深翻还田后经过分解所释放的氮素可以改变土壤氮素的供应水平，使亚耕层土壤速效氮含量增加显著。

3. 秸秆深翻还田能够降低土壤容重，形成良好的土壤空隙结构，提高黑土地土壤的储水能力与入渗能力，增加

浙江省嘉善县某公司，每年可利用秸秆超过2.1万吨、家禽排泄物1.05万吨，生产发酵食用菌基料超3.6万吨，其中60%左右基地自用，其余提供周边农户使用，年可实现6个生产周期，年产双孢蘑菇9100吨，以常年供应江浙沪大型超市和周边市场为主，年产值可达8000万元，经济、社会、生态效益显著。

十、秸-炭-肥还田改土模式

（一）模式内涵

“秸-炭-肥”还田改土模式，是将农作物秸秆通过低温热裂解工艺转化为富含稳定有机质的生物炭，然后以生物炭为介质生产炭基肥料，并返回农田，以改善土壤结构及其他理化性状，增加土壤有机碳含量，实现秸秆在农业生产过程中的循环利用。

（二）模式特点

1. 生物炭是一种碳含量极其丰富的炭，可以稳定地将碳元素固定长达数百年。为了应对全球气候变化，在农业领域，生物炭作为一种农业增汇减排技术途径得到不断开发和应用。

2. 生物炭可与其它材料混配成功能型生物炭复合材料（炭基肥），主要功能包括改良土壤，增加地力，改善植物生长环境，提高土地生产力及产品品质，应用领域主要是农田、林地和草坪等。

第01版：今日要闻　　◆下一版

土壤排放多少温室气体不再是笔"糊涂账"

科技日报讯 （记者张晔 通讯员张惠娟 赵烨烨）温室效应、酸雨、臭氧层破坏……这些环境危机的重要元凶就是氮氧化物，搞清楚氮氧化物的来源与数量显得极为重要。

南京农业大学邹建文教授课题组通过建立全球土壤氮氧化物排放数据库，定量估算了氮肥施用所导致的土壤氮氧化物排放量，为有效控制土壤氮氧化物排放找到了方向。该成果8月29日发表在最新一期《全球变化生物学》上。

课题组通过搜集原位观测资料，建立了全球土壤氮氧化物排放数据库，明确了全球土壤氮氧化物排放的主要驱动因子，定量估算了全球土壤氮氧化物排放强度。发现氮肥施用所引起的土壤一氧化氮和氧化亚氮总排放系数全球平均值为2.58%。其中，新开垦的热带亚热带酸性森林和草地生态系统是土壤氮氧化物排放的热点。在农田生态系统中，氮肥施用量大的菜地土壤氮氧化物排放量最高，总排放系数为4.13%，稻田土壤氮氧化物排放量最低。硝酸铵较其他氮肥品种导致的土壤氮氧化物排放量更大，排放系数为5.97%。

该研究在全球土壤氮氧化物排放源估算的精准化和针对性方面取得了新的突破。并提出用有机部分代替化肥、降低化学氮肥施用量、施用缓释肥等新型肥料、以及加强水分管理等措施，对于指导土壤氮氧化物减排具有参考价值。

Renewable Energy
global innovations

RESPONSE OF SOIL CARBON DIOXIDE FLUXES, SOIL ORGANIC CARBON AND MICROBIAL BIOMASS CARBON TO BIOCHAR AMENDMENT: A META-ANALYSIS

Significance Statement

Researchers from Nanjing Agricultural University reviewed 395 individual experiment observations derived from 50 peer-reviewed publications which were synthesized to examine the response of soil carbon dioxide fluxes, soil organic carbon and microbial biomass carbon (MBC) to biochar amendment using meta-analysis procedures. Their work published in journal, *Global Change Biology Bioenergy* examined the effect of size of biochar amendment on soil carbon dioxide fluxes, SOC and MBC contents and identified the key factors that influence the response of soil carbon dioxide fluxes, soil organic carbon and microbial biomass carbon to biochar amendment.

Biochar as carbon-rich co-product of pyrolysis biomass subject to high-temperature and oxygen-derived conditions for biofuel production has been advocated as potential management strategy to improve soil quality, crop yield increase and soil carbon sequestration enhancement.

About the author

Jianwen Zou, Ph.D., Professor

College of Resources & Environmental Sciences- Jiangsu Key Laboratory of Low Carbon Agriculture & GHGs Mitigation, Nanjing Agricultural University, China

Jianwen Zou, National Outstanding Young Scientist Award, Premium Professor of Jiangsu Province, and he is also the Director of Jiangsu Key Laboratory of Low Carbon Agriculture & GHGs Mitigation, Vice Dean of College of Resources & Environmental Sciences in Nanjing Agricultural University.

He is also the member of Sector of Agriculture and Forest, Science & Technology Commission of Ministry of Education, China. His research focuses on soil carbon and nitrogen cycling and global change, agricultural greenhouse gases accounting and mitigation.

Journal Reference

Shuwei Liu[1,2], Yaojun Zhang[1,2], Yajie Zong[1,2], Zhiqiang Hu[1,2], Shuang Wu[1,2], Jie Zhou[1,2], Yaguo Jin[1,2], Jianwen Zou[1,2]. **Response of Soil Carbon Dioxide Fluxes, Soil Organic Carbon and Microbial Biomass Carbon to Biochar Amendment: A Meta-Analysis.** Global Change Biology Bioenergy, 2016, Volume 8, pp 392-406.

Show Affiliations

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