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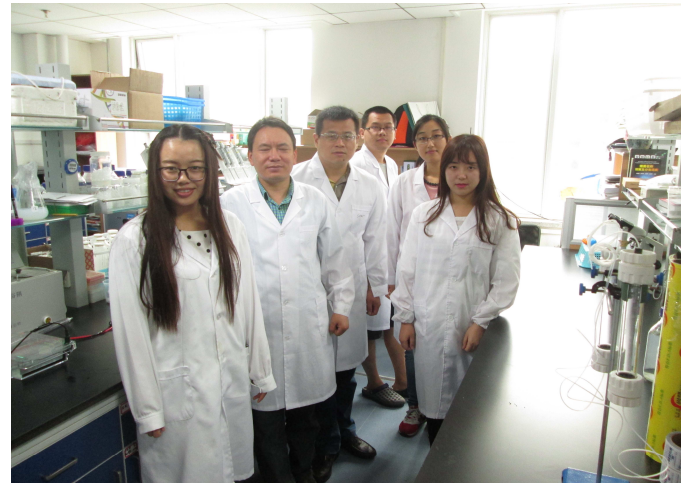
**简介：**张瑞福，山东泰安人，1974年出生于山东省泰安市。2004年4月在南京农业大学获理学博士学位，2004年6月起先后在香港大学、美国德克萨斯农工大学、加州大学戴维斯分校从事博士后研究。2010年4月起作为南京农业大学高层次引进人才任南京农业大学资源与环境科学学院教授，博士生导师。2013年入选教育部新世纪优秀人才，2014年6月入选中国农科院英才计划，2016年入选科技部中青年科技创新领军人才。兼任中国农科院农业资源与农业区划研究所微生物资源与利用研究室研究员，博士生导师。主要从事根际微生物与生物肥料、农业废弃物资源化利用、微生物菌种保藏研究。



实验室：资环楼 A609  
办公室：资环楼 C602  
Tel: 025-84396477  
Email: rfzhang@njau.edu.cn  
zhangruifu@caas.cn



南京实验室人员



北京实验室人员

## 教育及工作经历：

1994.9-1998.6 山东莱阳农学院 农学系 农学学士

1998.9-2004.4 南京农业大学微生物学系 硕博连续 理学博士

2004.6-2006.6 Department of Biodiversity & Ecology, Hong Kong University, Postdoctoral Research Fellow

2006.6-2008.9 Department of Microbiology & Plant Pathology, Texas A&M University, Postdoctoral Research Associate.

2008.9-2010.5 Department of Biological & Agricultural Engineering, University of California, Davis, Postdoctoral Research Associate

2010.5- 南京农业大学资源与环境科学学院 教授 博士生导师。

2014.7- 中国农科院农业资源与农业区划研究所微生物资源与利用研究室 研究员

## 学术与社会兼职：

(1) SCI 杂志 International Biodeterioration & Biodegradation 编委 (2008 年至今)；

(2) 中国微生物学会常务理事

(3) 中国微生物学会资源微生物专委会主任

- (4) 中国微生物学会农业微生物专委会委员
- (5) 中国土壤学会理事
- (6) 中国土壤学会土壤生物与生化专委会委员
- (7) 中国植物营养与肥科学会生物与有机肥专委会委员
- (8) 中国农科院微生物资源收集、保藏与发掘利用创新团队首席科学家
- (9) 中国农科院农业资源与农业区划研究所微生物学科点点长
- (10) 中国农业微生物菌种保藏管理中心主任
- (11) 国家微生物资源共享服务平台工作委员会常务副主任（负责人）
- (12) 农业部农业微生物资源收集与保藏重点实验室主任
- (13) 江苏省固体有机废弃物资源化高技术研究重点实验室副主任
- (14) 第七届农业部肥料评审登记委员会委员
- (15) 农业部耕地质量建设与管理专家指导组专家
- (16) 《微生物学杂志》编委

## 教学工作

本科生教学：《资源环境生物技术》专业必修课程

研究生教学：《土壤微生物研究进展》、《科技论文写作》

## 研究方向：

- (1) **根际微生物与微生物肥料**：植物根际微生物被看作是植物的第二个基因组，具有促进植物生长、提高养分的有效性和吸收、诱导宿主植物抵抗生物与非生物逆境、协助宿主植物抑制土传病害等功能，对植物生长和健康有重要影响。根际微生物对于开发绿色环保的生物肥料等农用微生物制剂具有重要价值。生物肥料已成为我国肥料产业重要成员之一，在促进化肥减施增效、提高农产品品质方面发挥重要作用。近年来，我国生物肥料产业以年均 20% 的速度增长，到 2015 年，达到了 1100 多家生产企业、2200 多个登记产品、产能超过 1000 万吨、产值近 200 亿元的规模。但从肥料总体上看，我国生物肥料规模还较小。限制生物肥料应用的主要瓶颈之一是其田间应用效果的不稳定性。对生物肥料中的微生物在复杂根际环境中的竞争定殖机制和生物肥料的作用机理研究将有助于从根本上发展突破生物肥料瓶颈的技术和产品提供理论支撑。芽孢杆菌、假单胞菌、木霉菌、根瘤菌等是主要应用菌种，其中分离自植物根际的促生芽孢杆菌占登记生物肥料产品使用菌种的 55% 以上。本实验室围绕根际有益微生物资源收集利用，建立了根际有益微生物资源库，指导企业开发了多个功能微生物肥料产品。以生物肥料中广泛使用的根际促生芽孢杆菌及其与根系互作为研究对象，解析了其在植物根际定殖的分子调控网络以及植物根系分泌物的介导作用，发现了菌-根互作协同促进植物生长的新机制，阐释了生物肥料和有机类肥料提高土壤质量的土壤微生物学机理。



- (7) “微生物有机肥产业发展中的关键技术研究”，2011BAD11B03，科技部科技支撑计划，255 万，2011.1-2015.12，课题主持。
- (8) “青年骨干人才培养与引进计划”03-80900205，江苏省优势学科建设项目，10 万，2011.7-2012.7，主持。
- (9) “高温木质纤维素酶制剂的研发及协同作用机理研究”，03-06J0425，中央高校基本科研业务费，40 万，2010.11-2012.11，主持。
- (10) “南京农业大学高层次引进人才科研启动经费”，680-804103，南京农业大学，50 万，2010.5-2015.5，主持。
- (11) “有机磷农药水解酶基因水平转移的分子基础研究”，30400014，国家自然科学基金青年基金，20 万，2005.1-2007.12，主持。
- (12) “农业资源与环境学科生物学研究创新引智基地（111 项目）”，B12009，教育部、国家外国专家局，2012.1-2016.12，中方骨干参加。

## 专利:

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- (2) 国家发明专利，李顺鹏，**张瑞福**，蒋建东，戴青华，崔中利，何健，2005，一种三唑磷农药残留降解菌及其生产的菌剂，CN200410044951.5。
- (3) 国家发明专利，李顺鹏，顾立锋，何健，洪青，**张瑞福**，蒋建东，2006，一种辛硫磷农药残留降解菌及其生产的菌剂，CN200510022545.3。
- (4) 国家发明专利，沈其荣；李荣；刘红军；黄蓉；文春燕；**张瑞福**；乔策策；邵钺 一种脱毒水解菜籽饼生产农用氨基酸肥的菌剂及工艺 2014/6/25, CN201410089043.1
- (5) 国家发明专利，沈其荣；梁晓琳；李荣；黄蓉；文春燕；**张瑞福**；沈标 一种全元复合微生物肥料及其制备方法和应用 2014/8/20, CN201410114967.2.
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- (7) 国家发明专利，沈其荣；王世梅；梁银；**张瑞福** 一种防除连作黄瓜枯萎病的拮抗放线菌及其微生物有机肥料，2013/9/4, 江苏, 2010.04.13 申请 2011.06.01 授权中华人民共和国国家专利局 已公开, CN201310177972.3.
- (8) 国家发明专利，**张瑞福**；邵佳慧；张楠 高产吡啶-3-乙酸的重组细胞及其构建方法与应用。申请日：2014.11.21 申请号：201410675072.6
- (9) 国家发明专利，**张瑞福**；邵佳慧；张楠 生物合成吡啶-3-乙酸的成套蛋白及其应用。申请日：2014.11.21 申请号：201410677417.1
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## 科技奖励:

- (1) 中国科协优秀科技论文奖，**张瑞福**，2008，中国科协。
- (2) 中国自然资源学会青年科技奖，**张瑞福**，2013，中国自然资源学会。
- (3) 教育部科技进步一等奖，沈其荣，徐阳春，杨帆，杨兴明，薛智勇，陆建明，徐茂，李荣，赵永志，黄启为，**张瑞福**，余光辉，冉

炜, 李荣, 沈标, 2013, 有机肥作用机制和产业化关键技术研究推广, 教育部。

- (4) **国家科技进步二等奖**, 沈其荣, 徐阳春, 杨帆, 杨兴明, 薛智勇, 陆建明, 徐茂, 李荣, 赵永志, 黄启为, **张瑞福**, 余光辉, 冉炜, 李荣, 沈标, 2015, 有机肥作用机制和产业化关键技术研究推广, 国务院。
- (5) **农业部中华农业科技奖优秀创新团队奖**, 沈其荣, 徐阳春, **张瑞福**, 邹建文, 杨兴明, 黄启为, 冉炜, 郭世伟, 余光辉, 沈标, 2015, 农业部。
- (6) **国家科技进步二等奖**, 李顺鹏, 崔中利, 沈标, 刘智, 何健, 杨新民, 王新华, **张瑞福**, 蒋建东, 洪青, 2005, 农药残留微生物降解技术的研究与应用, 国务院。
- (7) **全国农牧渔业丰收三等奖**, 李顺鹏, 崔中利, 沈标, 刘智, 何健, 顾向阳, **张瑞福**, 蒋建东, 王新华, 傅立斌, 荆留民, 刘军, 洪青, 陈立伟, 房金钱, 2004, 农药残留微生物降解技术的研究与应用, 农业部。

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- (1) **Zhang R** and Shen Q\*, 2017. The unseen rhizosphere root-soil-microbe interactions for crop production. *Current Opinion in Microbiology* (Invited Review, In Press)
- (2) Zhao J, Ni T, Xun W, Huang X, Huang Q\*, Ran W, Shen B, **Zhang R** and Shen Q. 2017. Influence of straw incorporation with and without straw decomposer on soil bacterial community structure and function in a rice-wheat cropping system. *Applied Microbiology & Biotechnology* (Pressed online, doi:10.1007/s00253-017-8170-3.)
- (3) Chen L, Liu Y, Wu G, Zhang N, Shen Q and **Zhang R\*** 2017. Beneficial rhizobacterium *Bacillus amyloliquefaciens* SQR9 induces plant salt tolerance through spermidine production. *Molecular Plant-Microbe Interactions* (In revision)
- (4) Liu Y, Chen L, Feng H, Xu Y, Li Z, Wu G, Zhang N, Zhang G, Shen Q and **Zhang R\*** 2017. Identification of root secreted compounds involved in the communication between soil-borne pathogen-cucumber-*Bacillus amyloliquefaciens* SQR9. *Molecular Plant-Microbe Interactions* (Pressed online, DOI:10.1094/MPMI-07-16-0131-R)
- (5) Raza W, Ling N, **Zhang R**, Huang Q, Xu Y, Shen Q\* 2017. Success evaluation of the biological control of Fusarium wilts of cucumber, banana, and tomato since 2000 and future research strategies. *Critical Review of Biotechnology*. 37(2):202-212.
- (6) Zhou C, Shi L, Ye B, Feng H, Zhang J, **Zhang R**, Yan X\* 2017. pheS\*, an effective host-genotype-independent counter-selectable marker for marker-free chromosome deletion in *Bacillus amyloliquefaciens*. pheS\*, an effective host-genotype-independent counter-selectable marker for marker-free chromosome deletion in *Bacillus amyloliquefaciens*. *Applied Microbiology & Biotechnology* 101:217-227.
- (7) Liu Y<sup>†</sup>, Yang D<sup>†</sup>, Zhang N, Chen L, Cui Z, Shen Q, **Zhang R\*** 2016. Characterization of uncultured genome fragment from soil metagenomic library exposed rare mismatch of internal tetranucleotide frequency. *Frontiers in Microbiology* 7:2081.
- (8) Zhang N<sup>†</sup>, Yang D<sup>†</sup>, Kendall JR, Miao Y, Zhang G, Druzhinina, IS, Kubicek CP, Shen Q and **Zhang R\*** 2016. Comparative genomic analysis of *Bacillus amyloliquefaciens* and *Bacillus subtilis* reveals evolutionary traits for adaptation to plant-associated habitats. *Frontiers in Microbiology* 7:2039.
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- (10) Zhou X, Fornara D, Ikenaga M, Akagi I, **Zhang R**, Jia Z\* 2016. The resilience of microbial community under drying and rewetting cycles of three forest soils. *Frontiers in Microbiology* 7:1101.
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- (12) Sun L, Xun W, Huang T, Zhang G, Gao J, Ran W, Li D, Shen Q and **Zhang R\*** 2016. Alteration of the soil bacterial community during the parent materials maturation driven by different fertilizations *Soil Biology & Biochemistry* 96:207-215.
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- (17) Xun W, Xiong W, Huang T, Ran W, Li D, Shen Q, Li Q and **Zhang R\*** 2016. Swine manure and quicklime have different impacts on chemical properties and composition of bacterial communities of an acidic soil. ***Applied Soil Ecology*** 100:38-44.
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