

2025 年北京市高等教育教学成果奖

教学成果应用及效果证明材料

成果名称：基于产教研融合的草原生态修复学新型研究生培养体系建设

成果完成人：董世魁、庾强、冯文婷、纪宝明、丁文利、崔晓庆、李颖
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海杰、邢方如

成果完成单位：北京林业大学

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兰州大学草地农业科技学院

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循,秉承“知山知水、树木树人”的校训精神,紧密对接国家生态文明建设与“美丽中国”战略需求,经过持续探索与迭代淬炼,形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念,构建起产教研深度融合的草原生态修复学新型研究生培养体系,培养出了以赫凤彩、左慧、张然等为代表的一大批优秀研究生。

我院在草学类研究生培养中,参考了北京林业大学上述教学成果的先进理念与机制,依托草业科学国家级重点学科和草种创新与草地农业生态系统国家重点实验室等平台,强化“基础研究—技术研发—产业示范”全链条育人模式。通过共建祁连山国家公园生态监测站、黄河流域草种繁育基地等产学研平台,推动研究生深度参与高寒草地修复、草种质资源创新等重大课题,显著提升了研究生在草地农业系统可持续管理方面的科技攻关能力。在国际化培养方面,我院依托“一带一路”草原农业创新联盟,与多国科研机构联合开设“全球草地治理”等英文课程,持续培养具备国际视野与生态责任的高层次草业人才。

北京林业大学的教学成果为我院研究生教育创新注入新动能,其经验在西北高寒草地与农业系统人才培养中展现出良好的适配性与推广价值,为推动生态文明建设提供有力支撑。

兰州大学草地农业科技学院

2025年9月1日

草地农业科技学院

兰州大学教学成果推广证明

甘肃农业大学草业学院

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了一大批优秀研究生。

我院结合寒旱区草地生态与草种质创新优势学科方向，积极引入北林经验，构建了“课堂—基地—产业”三位一体的实践教学体系。依托河西走廊国家草品种区域试验站和天祝高寒草地生态系统试验站，组织研究生参与草原生态修复、耐旱草种选育等科技项目，强化其在干旱半干旱地区草地恢复与可持续经营方面的实战能力。同时，我院依托省级草学学科建设项目，推动研究生参与“丝绸之路”沿线国家草原技术示范交流，开设草地碳汇与生态治理专题课程，有效提升人才的国际交流与合作能力。北林大教学成果在我院的应用，显著增强了草业高层次人才培养的针对性与服务区域生态建设的贡献度。

甘肃农业大学草业学院
2025年9月1日

甘肃农业大学教学成果推广证明

内蒙古民族大学草业学院

北京林业大学研究生教学成果

推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养了一大批优秀研究生。

我院立足科尔沁沙地草原生态修复与牧区振兴需求，积极借鉴北林大经验，打造“沙地草地可持续经营”为重点的教学实践体系。通过共建西辽河流域生态监测站、奈曼草地试验基地，推动研究生参与沙化草地治理、家庭牧场优化等地方服务项目，强化其生态治理与牧区发展协同推进的实战能力。在国际交流方面，我院依托中蒙草原生态联合实验室，开展蒙古高原草地恢复技术合作研究，开设蒙汉双语草原政策课程，培养扎根边疆、服务民族的草业专门人才。

北林大成果为我院提升草业研究生教育质量与区域适配性提供了有力支持。

内蒙古民族大学草业学院

2025年9月5日



内蒙古民族大学教学成果推广证明

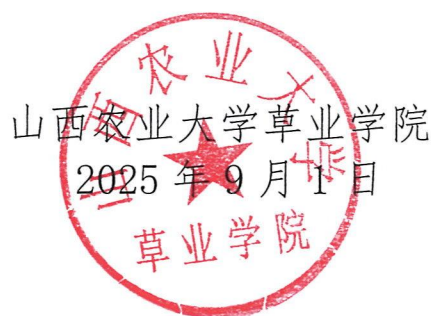
山西农业大学草业学院

北京林业大学研究生教学成果推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了以赫凤彩、左慧、张然等为代表的一大批优秀研究生。

我院紧扣黄土高原生态治理与草牧业高质量发展需求，借鉴北林大“理论实践融合好”的培养思路，强化“生态草业与区域特色”相结合的教学体系。依托晋北草地生态试验站和山西草种质创新平台，组织研究生开展退耕还草、矿区植被恢复等科技服务，提升其在生态脆弱区系统治理中的实践创新能力。同时，我院加强与京津冀高校协同，推动研究生参与华北农牧交错带生态产业示范项目，开设“草地资源与乡村生态振兴”专题课程，增强学生立足区域、服务三农的使命意识。

北京林业大学的教学成果有效促进了我院草业人才培养与区域生态经济的深度融合。



青岛农业大学草业学院

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了以赫凤彩、左慧、张然等为代表的一大批优秀研究生。

我院结合东部沿海地区草业特点，积极引入北林大教学成果，构建“盐碱草地修复与草坪科学”为特色的培养体系。依托山东省滨海草业工程技术中心、黄河三角洲草种质资源基地等平台，组织研究生参与盐碱地改良、海岸带生态防护等科技攻关，增强其在特殊生境草地构建与城市生态绿化方面的技术应用能力。同时，我院强化与日韩草坪研究机构合作，开设草坪科学与绿地管理国际课程，推动研究生参与东亚城市生态建设交流项目，提升人才的国际竞争力与产业服

务能力。

北京林业大学的教学成果为我院培养适应海洋生态文明建设的高素质草业人才注入了新动能。



北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了一大批优秀研究生。

我院依托植物学国家级植物学实验教学示范中心、草地资源教育部重点实验室等平台，深度融合北京林业大学经验，构建了“基础—应用—产业”贯通的草学研究生培养模式。通过联合建设锡林郭勒草业科技小院、正镶白旗典型草原生态系统内蒙古自治区野外科学观测研究站等基地，组织研究生参与退化草原恢复、草牧业智慧管理等重大课题，显著增强其在北方草原保护与可持续利用方面的科技支撑能力。在国际合作方面，我院深化与蒙古、新西兰等国草原院校的协作，联合开展“草原生态与全球变化”课程建设，持续培养具备跨文化沟通能力的草业领军人才。

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内蒙古农业大学教学成果推广证明

北京林业大学教学成果在我院的推广，为祖国北疆草原生态安全屏障建设提供了高质量人才保障。

内蒙古农业大学草业学院

2025年9月10日



内蒙古农业大学教学成果推广证明

新疆农业大学草业学院

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了一大批优秀研究生。

我院立足新疆草原资源与生态安全战略需求，将北林经验与区域特色相结合，重点打造“荒漠草地修复与绿洲牧业系统”育人方向。通过联合建设天山草原生态观测站、伊犁草种资源圃等实践平台，推动研究生参与退化草地治理、牧区智慧草业等自治区重大专项，强化其在高寒干旱区生态修复与草牧业协同发展方面的技术集成能力。在国际合作方面，我院依托上海合作组织农业技术交流中心，积极开展中亚草原可持续管理联合研究，开设中亚多语种课程模块，培养面向“一带一路”的复合型草业人才。

北林大成果在我院的推广，为边疆地区草地生态保护与草业高质量发展提供了坚实人才支撑。

新疆农业大学草业学院

2025年9月7日



新疆农业大学教学成果推广证明

青海大学农牧学院

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养了一大批优秀研究生。

青海大学农牧学院立足三江源国家公园生态保护与高寒草地可持续利用战略需求，积极融合北林大经验，构建“高寒草地生态—牧区系统管理”为特色的育人体系。通过共建三江源草地生态系统观测站、青海湖流域生态修复基地，组织研究生参与国家公园建设、退化草地恢复等重大科技项目，强化其在高寒地区草地生物多样性保护与适应性管理方面的技术集成能力。在国际合作方面，农牧学院依托青藏高原国际研究中心，推动研究生参与全球高山草地联合研究计划，开设高寒生态与碳汇专题课程，培养服务青藏高原生态安全屏障建设的专门人才。

北京林业大学教学成果在农牧学院的推广应用，为高寒草地生态保护与区域可持续发展提供了坚实人才支撑。

青海大学农牧学院

2025年9月6日

青海大学教学成果推广证明

西北农林科技大学草业与草原学院

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养了一大批优秀研究生。

我院依托旱区现代牧业与草原生态修复学科群，深度融合北林大经验，构建了“草源—草原—草业”全链条育人模式。通过共建黄土高原草原生态系统定位站、秦巴山区林草复合经营基地等平台，引导研究生参与国家林草融合试点、退牧还草工程等重大项目，强化其在草原碳汇、草种资源利用等前沿领域的科研转化能力。在国际化方面，我院强化与澳大利亚、新西兰等草地科学强校的合作，设立“旱区草地科学与政策”双语课程，培养具备全球视野的草业创新人才。

北林大成果在我院的推广应用，有力支撑了旱区草地农业与生态安全领域高层次人才的培养质量。

西北农林科技大学草业与草原学院

2025年9月12日

草业与草原学院

西北农林科技大学教学成果推广证明

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了一大批具备扎实理论基础与实践创新能力的高层次人才。

在“职业教育国家级培训计划（职教国培）”项目中，我校积极引入北林大研究生教学成果，将其生态修复理念、草原系统治理方法与职业教育师资培养有机结合。通过开设“草原生态修复与绿色职教”专题模块，组织学员参与生态修复案例研讨、实地教学与技能实训，显著提升了职业院校教师在生态保护与可持续发展领域的教学设计与实施能力。

北林大成果在我校培训项目中的推广，为职业教育师资队伍队伍建设注入了生态文明新内涵，增强了职业院校服务区域生态安全与绿色发展的能力。



兴安职业技术学院大学教学成果推广证明

科尔沁右翼前旗绿水种畜繁育中心文件



北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”校训，面向国家“美丽中国”战略需求，持续迭代形成“三农情怀深、生态文明理念牢、国际视野广、理论实践融合好”的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型培养体系，培养了一大批高水平研究生。

我中心依托与北京林业大学草业与草原学院、兴安盟科协共建的“草业科技小院”，将该教学成果直接应用于天然草地修复与乡土草种繁育一线，把课堂搬进牧场，把试验做进草场，使研究生在真实的生态恢复与绿色产业环境中完成课程模块、科研训练与技术示范，实现了教学与生产、科研与推广的无缝衔接，显著提升了高层次应用型草业人才的培养效率和区域草原生态产业服务能力。

北林大成果在我站的推广应用，有力支撑了内蒙古高原东部草地农业与生态安全领域高层次人才的培养质量。

科右前旗绿水种畜繁育中心

2025年9月28日



科右前旗绿水种畜教学成果推广证明

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了一批批扎根基层、服务一线的草原生态保护与修复骨干人才。

我站作为青海省草原生态保护与改良的重要技术支撑单位，高度重视北林大研究生教学成果的转化应用。通过共建北京林业大学研究生校外实践基地、组织北林大研究生与我站技术人员联合开展草原生态修复技术与示范，合作开展“高海拔冻土区退化草地生态恢复关键技术转化与示范”等专题培训，系统提升了基层农牧民在草地生态修复、优良草种选育、退化草地治理及智慧草原管理等方面的技术认知与应用能力。

北京林业大学研究生在我站的实践与合作，不仅增强了其自身的实践能力与服务水平，也有效推动了我站技术推广模式的创新，显著提升了草原生态保护与草业高质量发展的科技支撑能力，为筑牢青藏高原生态安全屏障提供了坚实的人才与技术保障。

青海省草原改良试验站

2025年9月1日



青海省草原改良试验站教学成果推广证明

北京林业大学研究生教学成果 推广应用证明

北京林业大学坚持以习近平新时代中国特色社会主义思想为根本遵循，秉承“知山知水、树木树人”的校训精神，紧密对接国家生态文明建设与“美丽中国”战略需求，经过持续探索与迭代淬炼，形成了以“三农情怀深、生态文明理念牢、国际视野广、理论与实践融合好”为特征的农林研究生育人共同体理念，构建起产教研深度融合的草原生态修复学新型研究生培养体系，培养出了一批批扎根基层、服务一线的草原生态保护与修复骨干人才。

我站作为内蒙古草原生态保护与修复的一线单位，高度重视北林大研究生教学成果的转化应用。通过联合开展“草原健康诊断与修复技术”专题培训、组织技术人员参与北林大草原生态修复实训基地学习，系统提升了基层人员在草地退化治理、草种资源利用、智慧牧区建设等方面的技术集成与推广能力。

北林大成果在我站的推广应用，有力推动了兴安盟草原生态保护与草牧业高质量发展，为筑牢我国北方生态安全屏障提供了坚实的技术与人才支撑。

兴安盟林业和草原工作站
2025年9月1日



兴安盟林业和草原工作站教学成果推广证明

中国地质调查局自然资源综合调查指挥中心

北京林业大学研究生教学成果 推广应用证明

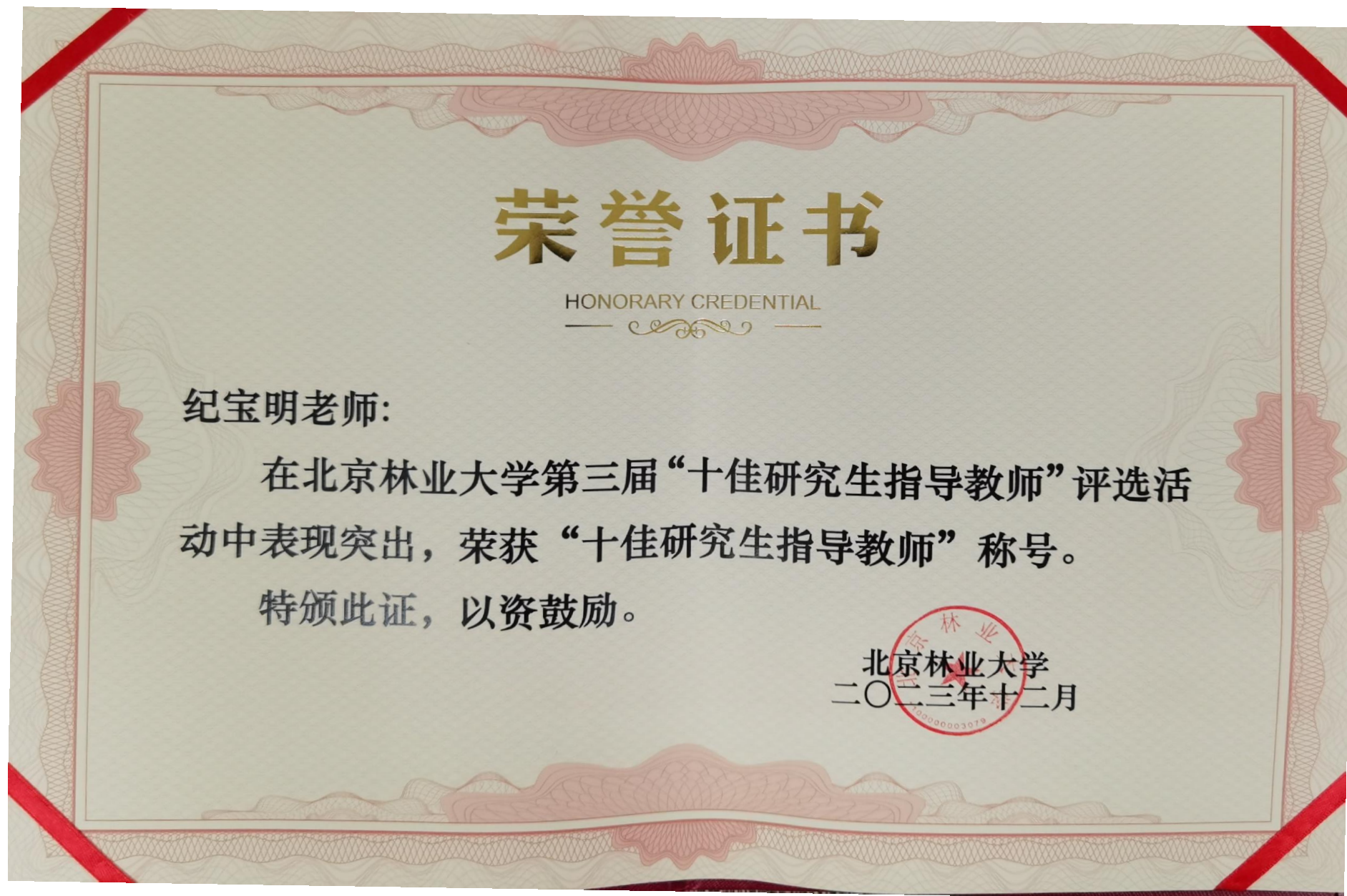
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指挥中心立足自然资源综合调查领域需求，高度重视北林大研究生教学成果的转化应用。通过联合开展“自然资源调查业务能力”专题培训、组织技术人员参与北林大草原生态修复实训基地学习，系统提升了指挥中心技术人员在草地资源调查监测、草地退化治理、草地资源利用等方面的技术集成与业务能力。

北林大成果在我单位的推广应用，有力推动了指挥中心在综合调查业务方面高质量发展，为全面提升高素质技能人才提供了坚实基础。





纪宝明获北京林业大学十佳研究生指导教师



纪宝明获优秀研究生学位论文指导教师

荣誉证书

HONORARY CREDENTIAL

纪宝明：

您被评为北京林业大学 2022—2023 年度优秀研究生学位论文指导教师，特发此证。

北京林业大学

二〇二三年六月二十四日

纪宝明获优秀研究生学位论文指导教师

荣誉证书

张静 纪宝明 平晓燕：

《课程思政视角下大学生创新训练项目指导
模式新探讨》荣获 2020 年北京林业大学教育教学
研究论文优秀奖。

特发此证。

北京林业大学
二〇二一年一月

纪宝明获北京林业大学教育教学研究论文优秀奖

荣誉证书

郭倩倩 尹淑霞 纪宝明：

《图像分析软件助力“草学试验方法”在线实验教学的探索》荣获 2020 年北京林业大学教育教学研究论文优秀奖。

特发此证。

北京林业大学
二〇二一年一月

纪宝明获北京林业大学教育教学研究论文优秀奖

全国农业专业学位研究生教育指导委员会秘书处

农业教指委秘〔2021〕24号



关于公布农艺与种业领域第一批示范性 教学案例的通知

在全国农业专业学位研究生教育指导委员会（以下简称“农业教指委”）的支持下，农艺与种业领域分委员会于2020年7月启动农业专业学位农艺与种业领域教学案例库建设项目。

来自中国农业大学、浙江大学、西北农林科技大学等八所大学农艺与种业领域培养单位的专业教师编写的24个教学案例，通过领域专家评审，符合农艺与种业领域案例入库标准，拟作为农业专业学位农艺与种业领域教学案例库第一批入库示范性案例，并推荐入库中国专业学位案例中心平台。具体案例名单公布如下：

序号	案例编号	案例名称	作者	第一作者单位
1	UTC0951312021001	2016年北京长阳国际高尔夫球场草坪枯死影响运营——草坪病害的诊断与病原菌物鉴定方法	尹淑霞、胡万石	北京林业大学
2	UTC0951312021002	2020年全国草地资源调查监测—草地资源调查监测技术方法	林长存、纪宝明	北京林业大学
3	UTC0591312021003	坝上丰宁县草原生态补奖政策实施效果调查与评价	戎郁萍	中国农业大学
4	UTC0591312021004	茶叶产品设计与加工技术创新集成实践案例	龚淑英、范方媛	浙江大学
5	UTC0591312021005	草类植物逆境生理	马西青	中国农业大学
6	UTC0591312021006	稻田种养模式发展案例解析	曹凑贵、江 洋	华中农业大学

北京林业大学第六届研究生精品课程入选名单
(排名不分先后)

序号	学院	课程编号	课程名称	课程性质	学时	学分	授课教师
1	环境学院	7017004	工程伦理	公共课	32	2	洪喻
2	外语学院	7009001	专业学位英语一外	公共课	48	3	李芝、吴增欣、刘真、马平、黄佩娟、孙莹
3	园林学院	3006071	当代乡土建筑	选修课	16	1	段威、邵大方、张若诗、丁立南、翟玉琨
4	信息学院	7004002	农林信息化案例研究	专业课	32	2	苏晓慧、赵天忠、李昀、曾怡
5	林学院	3001034	林木营养与施肥	专业课	32	2	王海燕、李素艳、耿玉清、栾亚宁
6	经管学院	3007034	林业经济统计专题	选修课	32	2	陈文汇、胡明彤、侯一蕾
7	环境学院	3017004	实验设计与数据分析	专业课	32	2	梁文艳、张盼月、程翔
8	生物学院	3002066	组学数据分析方法	选修课	48	3	谢剑波、钮世辉、薄文浩、袁峥嵘
9	草学院	3022006	草原生态修复学	选修课	32	2	董世魁、崔晓庆、沈豪
10	材料学院	3005019	高等木材学	专业课	32	2	马尔妮、林剑、曹金珍
11	经管学院	MBA049	营销管理	专业课	32	2	李小勇、张砚
12	马克思主义学院	3021058	新时代中国特色社会主义思想理论与实践	公共课	36	2	张秀芹、张婷、兰俏枝、王晓丹、樊阳程、蔚蓝、蔡紫薇、牟文鹏、徐凤、杨哲、朱洪强

《草原生态修复学》入选北京林业大学研究生精品课程



纪宝明获林业领域技术应用案例

RE: Application - Call for submissions: Best practices in conservation, restoration, and sustainable use of rangelands as nature-based solutions - Shikui Dong ☆ 𐀀



发件人: **Srijana Joshi Rijal** <Srijana.Joshi@icimod.org>

时 间: 2024年12月11日(星期三) 晚上11:48

收件人: 董世魁 <dongshikui@bjfu.edu.cn>

抄 送: Yi Shaoliang <Yi.Shaoliang@icimod.org>

附 件: 2 个 ( Vendor ID Template.docx...)

翻译全文 |   

Dear Prof Dong,

Greetings from ICIMOD

We hope this email finds you well. We are pleased to inform you that you have been awarded a grant of **USD 1000** to prepare detailed documentation of best practices. We will share the outline of the best practices for detailed documentation. We kindly request you to provide your **BANKING DETAILS** so that we can facilitate the transfer of the grant amount. We will appreciate if you can submit your banking details and fill the vendor form and share the void cheque (as attached for reference) by **13th December**

Looking forward to receiving your information

Regards,

Srijana

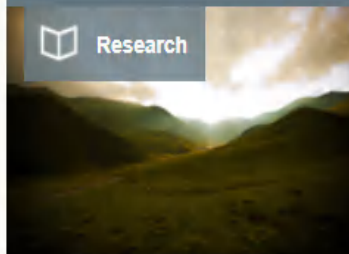
董世魁获ICIMOD最佳应用案例


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Search results for 'Sustainable Alpine Rangeland Management, China'

 Research


Sustainable Alpine Rangeland Management, China

For decades, scientists in China have been researching alpine grassland degradation on the Qinghai Tibetan Plateau, a 2.5 square kilometer area that spans China's most western provinces, including Tibet, Qinghai, ...

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Sustainable Development

草原生态修复学课程纳入全球环境类课程案例教学网络平台

Shikui Dong · Yong Zhang · Hao Shen · Shuai Li · Yudan Xu

Grasslands on the Third Pole of the World

Structure, Function, Process, and Resilience of Social-Ecological Systems

This book comprehensively covers the topics of origin and distribution, evolution and types, regional and global importance, biodiversity conservation, plant-soil interfaces, ecosystem functions and services, social-ecological systems, climate change adaptations, land degradation and restoration, grazing management and pastoral production, and sustainable future of the grasslands on the Qinghai-Tibetan Plateau (QTP), which is a globally unique eco-region called the “Roof of the World” because of its high elevation, “Third Pole on Earth” because of its alpine environment and the “Water Tower in Asia” because of its headwater location. The grassland ecosystem covers above 60% of QTP, which is about 2.5 million km², 1/4 of Chinese total territorial lands.

The grassland ecosystem of the QTP (the Third Pole) is an important part of the palaearctic region, which features alpine cover and low oxygen. The Third Pole's grasslands not only provide important ecosystem functions such as biodiversity conservation, carbon storage, water resource regulation, climate control, and natural disaster mitigation at a global scale, but also provide critical ecosystem services such as pastoral production, cultural inheritance, and tourism and recreation at local and regional scales.

The purposes of this monograph are to address the following questions: (1) What are the special features of the Third Pole's grasslands? (2) How have climate changes and human activities changed the structures and functions of the Third Pole's grasslands? (3) How can we cope with land degradation and climate change through innovative restoration and protective actions for Third Pole's grasslands? And (4) How can we promote the sustainable development of social-ecological systems of the Third Pole's grasslands through best management practices including grazing? The goal of this book is to attract the attention of international audiences to realize the importance of the Third Pole's grasslands, and to call for the actions of global communities to effectively protect and sustainably use the Third Pole's grasslands. This book can be served as textbooks, teaching materials and documentaries for different audiences. The target audiences include students, teachers, researchers, policy makers, planners, government officials, and NGOs in agricultural, environmental and natural resources sectors.

ISBN 978-3-031-39484-3



▶ springer.com

Dong · Zhang · Shen · Li · Xu

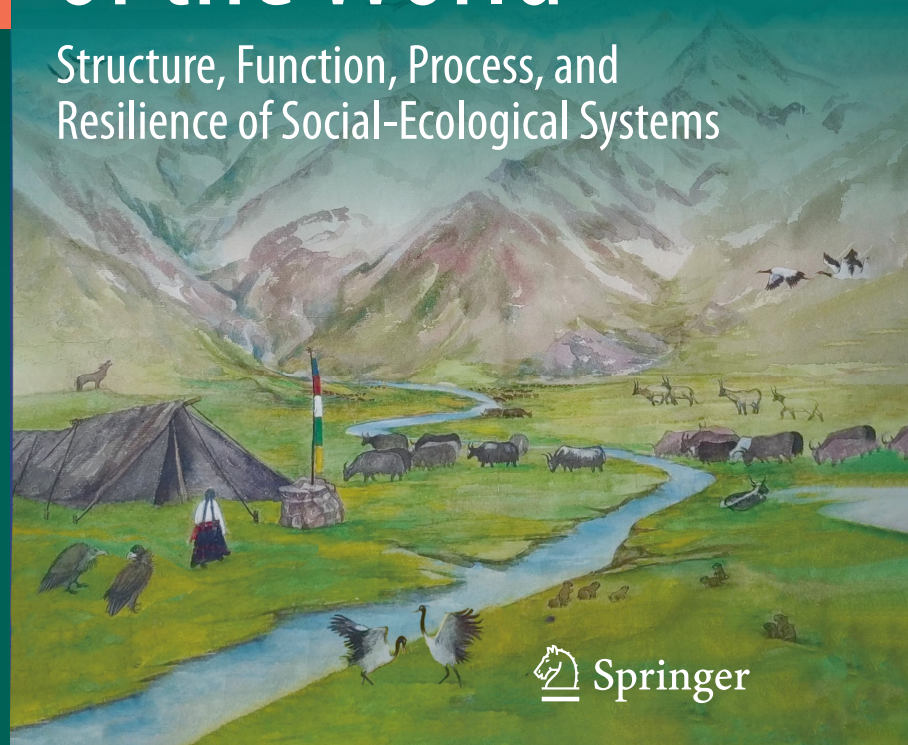


Grasslands on the Third Pole of the World

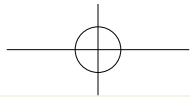
Shikui Dong · Yong Zhang
Hao Shen · Shuai Li · Yudan Xu

Grasslands on the Third Pole of the World

Structure, Function, Process, and
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 Springer



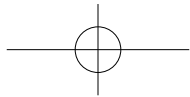
退化草原生态修复 主要技术模式

董世魁 ◎ 主编



 中国林业出版社
China Forestry Publishing House

草原生态修复学课程相关教材



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中国草原可持续发展 战略研究



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项目名称:	“草原生态修复前沿”案例研讨课程建设
课程编号:	2022002
课程名称:	草原生态修复前沿
项目经费:	1 万元
项目期限:	2019 年 12 月—2020 年 11 月
负 责 人:	董世魁
手机及 E-mail:	13811445835, dongshikui@sina.com
推荐单位:	<u>草业与草原学院</u>

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项目名称:	“草原生态修复学”线上+线下混合式教学
课程编号:	3022006
课程名称:	草原生态修复学
项目经费:	1 万元
项目期限:	2019 年 12 月—2020 年 11 月
负 责 人:	董世魁
手机及 E-mail:	13811445835, dongshikui@sina.com
推荐单位:	<u>草业与草原学院</u>

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附件 4:

资助编号	KCSZ23016
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北京林业大学研究生教学改革研究 项目任务书

项目名称:	“草原生态修复学”课程思政元素的挖掘与融入
子项目类别:	研究生课程思政建设项目
课程编号:	3022006
课程名称:	草原生态修复学
项目经费:	0.5 万元
起止时间:	2023.06.08-2024.06.08
负 责 人:	董世魁
所在单位:	草原与草业学院
填写日期:	2023 年 6 月 12 日

北京林业大学研究生院制

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资助编号

HXKC25009

北京林业大学研究生课程建设 项目任务书

项目名称:	基于数智化理念的《Ecological Restoration》 教学改革研究
子项目类别:	优质研究生核心课程建设项目
课程编号:	8022007
课程名称:	Ecological Restoration
项目经费:	1.2 万元
起止时间:	
负责人:	徐一鸣
所在单位:	草业与草原学院

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附件 5:

资助编号	JXGG23052
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北京林业大学研究生课程教学改革研究 项目任务书

项目名称:	《Ecological Restoration》课程内容及教学模式国际化研究
子项目类别:	研究生教学改革研究项目
项目经费:	0.5 万元
起止时间:	2023.06.08-2024.06.08
负责人:	丁文利
所在单位:	草业与草原学院
填写日期:	2023 年 6 月 9 日

北京林业大学研究生院制

丁文利获批北京林业大学研究生课程教改项目

喜报！我院获批首个国家定位观测研究站

时 间:2023-09-05

日前，国家林业和草原局下发了《关于批复新建四川米亚罗森林生态系统国家定位观测研究站等8个国家陆地生态系统定位观测研究站的通知》（林科发〔2023〕83号），依托我校作为技术支撑单位的“内蒙古科尔沁草原生态系统国家定位观测研究站”入选新建名单，这是我校获批的第一个省部级草原生态系统定位观测研究站，也是内蒙古自治区林业和草原局获批的第一个草原生态系统定位观测研究站。

国家林业和草原局文件

林科发〔2023〕83号

国家林业和草原局关于批复新建四川米亚罗森林生态系统国家定位观测研究站等8个国家陆地生态系统定位观测研究站的通知

各有关单位：

你单位提出的建立国家陆地生态系统定位观测研究站（以下简称“生态站”）申请收悉。根据初步审查、现场评审等情况，我局同意批复新建“四川米亚罗森林生态系统国家定位观测研究站”等8个生态站，并将有关事项通知如下：

新建生态站要严格按照《国家陆地生态系统定位观测研究站管理办法》（林科发〔2023〕56号）等有关规定开展建设与运行工作，紧紧围绕科学研究、观测评估、示范应用和社会服务等主要任务，严格执行相关技术标准规范，加强观测设施、数据管理、规章制度、人才队伍等方面建设，不断提高观测研究能力和水平。

各归口管理单位要切实加强对生态站工作的指导、监督、管理，

附件

新建国家陆地生态系统定位观测研究站名单

序号	生态站名称	归口管理单位	技术支撑单位
1	四川米亚罗森林生态系统国家定位观测研究站	中国林业科学研究院	中国林业科学研究院森林生态环境与自然保护研究所
2	陕西延安森林生态系统国家定位观测研究站	中国科学院	中国科学院生态环境研究中心
3	内蒙古科尔沁草原生态系统国家定位观测研究站	内蒙古自治区林业和草原局	北京林业大学
4	黑龙江乌伊岭湿地生态系统国家定位观测研究站	黑龙江省林业和草原局	哈尔滨师范大学
5	广西桂林城市生态系统国家定位观测研究站	广西壮族自治区林业局	广西壮族自治区中国科学院广西植物研究所
6	黑龙江松嫩平原农田防护林生态系统国家定位观测研究站	黑龙江省林业和草原局	黑龙江省林业科学院齐齐哈尔分院
7	广东广宁竹林生态系统国家定位观测研究站	国际竹藤中心	国际竹藤中心
8	贵州赤水竹林生态系统国家定位观测研究站	国际竹藤中心	国际竹藤中心、贵州省林业科学研究院

时 间:2021-10-15

近日，国家林业和草原局公布了第三批41个国家林业和草原长期科研基地名单，北京林业大学草业与草原学院牵头组织申报、董世魁院长为负责人的“内蒙古林草过渡区草原国家长期科研基地”成功获批。

**国家林业和草原局关于公布第三批国家林业和草原长期
科研基地名单的通知**
林科发〔2021〕96号



各省、自治区、直辖市、新疆生产建设兵团林业和草原主管部门，
国家林业和草原局各司局、各派出机构、各直属单位、大兴安岭林
业集团：

按照国家林业和草原长期科研基地建设工作安排，在各地各单位
推荐、专家评审的基础上，经研究，我局决定设立第三批41个国
家林业和草原长期科研基地，现将名单（见附件）予以公布。

各地各单位要重视长期科研基地的建设和管理，不断总结经
验，创新管理模式，调动各方积极性，扎实推进各项工作，充分发
挥其在承接各类科学研究、推动科技成果转化、加强科普宣传等方
面的重要作用，为更好地支撑保障我国林草事业发展作出积极贡
献。

特此通知。

附件：第三批41个国家林业和草原长期科研基地名单

国家林业和草原局
2021年10月9日

北京林业大学科研教学基地 落户内蒙古科右前旗乌兰毛都大草原

北林草学资讯 2020年08月09日 21:47

为深入贯彻落实习近平生态文明思想，践行“山水林田湖草系统治理”新理念，围绕党中央对口帮扶的重大决策，6月，我校与科右前旗签署了草原科学实验站共建协议，为进一步落实王洪元书记的讲话精神，在治本之策和山水林田湖草系统治理两个层面上精准发力，8月8日上午，在科右前旗绿水种畜场举行了北京林业大学科右前旗草原科研教学基地挂牌仪式。北京林业大学党委副书记、校长安黎哲、内蒙古兴安盟林草局局长白长峰，科右前旗旗委常委、常务副旗长刘刚、科右前旗副旗长孟祥刚出席活动。北京林业大学党政办、发展规划处、教务处、实验室管理处等相关职能处室负责人、草业与草原学院负责人及学院教师代表、兴安盟草原站、科右前旗绿水种畜场负责人参与活动。



安黎哲校长、白长峰局长、刘刚常务副旗长和学校发展规划处处长刘宏文共同为“内蒙古兴安盟草原生态系统野外科学观测研究站”挂牌，学校教务处处长黄国华、草业与草原学院常务副院长董世魁、科右前旗绿水种畜场党支部书记苏日嘎拉图共同为“北京林业大学教学实习基地”挂牌，学校实验室管理处处长杨雪松、草业与草原学院党总支书记苏静、兴安盟草原站站长胥健、科右前旗绿水种畜场场长包福财共同为“北京林业大学草业科学科右前旗试验站”挂牌。在前期北京林业大学与科右前旗政府签订的共建草原野外研究站合作协议的框架基础上，为保障科右前旗草原科研教学基地建设工作的开展，进一步搭建兴安盟草业科技智库平台，北京林业大学草业与草原学院党总支书记苏静、兴安盟草原工作站站长胥健和科右前旗绿水种畜场党支部书记苏日嘎拉图共同签署了合作协议书。

内蒙古科尔沁草原生态系统国家定位观测研究站在兴安盟揭牌成立

兴安盟动植物视界 2023年11月01日 11:48 内蒙古

10月31日，内蒙古科尔沁草原生态系统国家定位观测研究站在科右前旗绿水种畜繁育中心正式揭牌成立，这是内蒙古首个草原生态系统国家定位观测研究站、内蒙古生态定位观测网络内第18个生态系统定位研究站。



内蒙古科尔沁草原生态系统国家定位观测研究站位于大兴安岭森林向科尔沁草原的过渡区，具有森林、草原、森林、湿地等多种生态系统。该站的建立，对于解决已垦草原生态修复需求紧迫、草畜平衡监管难度大、产业发展落后等问题，统筹推进山水林田湖草沙系统治理，推动兴安盟生态保护与绿色发展，助力打好“三北”工程攻坚战具有重要意义。

中科院遗传与发育生物学研究所曹晓风院士一行在省草原改良试验站开展草种质资源保护利用调研并参加挂牌仪式

青海林草 2022年08月08日 19:54 青海



8月3日—4日，中科院遗传与育种生物学研究所曹晓风院士、北京林业大学草业与草原学院院长董世魁教授一行5人，到省草原改良试验站调研草种质资源保护利用及草种业创新创制情况，并出席“北京林业大学研究生实践基地”挂牌仪式。省林业和草原局党组成员、副局长王恩光，海南州副州长王学军，省林草局相关处室、单位主要负责同志参加。



2022年北京林业大学研究生实践基地/研究生工作站评选结果公示名单

(排名不分先后)

序号	所在学院	基地/工作站名称	适于开展实践的专业学位类别(领域)	基地类别	负责人
1	草业与草原学院	青海省草原改良试验站	草学/农艺与种业	事业单位	董世魁
2	人文社会科学学院	北京市社会心理工作联合会	应用心理	行业部门	杨智辉
3	水土保持学院	北京林森生态环境技术有限公司	林业	企业	张建平
4	水土保持学院	中国林业科学研究院沙漠林业实验中心	林业	事业单位	肖辉杰
5	林学院	山东省高唐县国有旧城林场	林学	事业单位	席本野
6	园林学院	北京市绿地管理事务中心	风景园林专业学位	事业单位	戴思兰
7	园林学院	笛东规划设计(北京)股份有限公司	风景园林专业学位	企业	李雄
8	信息学院	北京合力金智科技发展有限公司	电子信息	企业	许福 王春玲
9	信息学院	中国电子科技集团公司信息科学研究院	电子信息	事业单位	许福

附件:

2024年北京林业大学研究生联合培养基地考核评估结果公示

序号	基地名称	所在学院	合作单位	负责人	评分	考核结果
1	北京林业大学-重庆缙云山国家级自然保护区管理局研究生联合培养基地	水土保持学院	重庆缙云山国家级自然保护区管理局	王玉杰 王云琦	94.00	优秀
2	北京林业大学-青海省草原改良试验站研究生联合培养基地	草业与草原学院	青海省草原改良试验站	董世魁	93.40	优秀
3	北京林业大学-北京北林地景园林规划院有限责任公司研究生联合培养基地	园林学院	北京北林地景园林规划院有限责任公司	刘志成	92.20	优秀
4	北京林业大学-山东省高唐县国有旧城林场研究生联合培养基地	林学院	山东省高唐县国有旧城林场	席本野	91.00	优秀
5	北京林业大学-笛东规划设计(北京)股份有限公司研究生联合培养基地	园林学院	笛东规划设计(北京)股份有限公司	李雄	90.20	优秀
6	北京林业大学-北京合力金智科技发展有限公司研究生联合培养基地	信息学院	北京合力金智科技发展有限公司	许福 王春玲	88.20	优秀
7	北京林业大学-江苏绿扬现代生态农业发展有限公司研究生联合培养基地	生物科学与技术学院	江苏绿扬现代生态农业发展有限公司	张柏林	86.80	优秀

2022年北京林业大学研究生实践基地/研究生工作站评选结果(上)
2024年北京林业大学研究生联合培养基地考核评估结果(下)

中国人民政治协商会议全国委员会

感 谢 函

北京林业大学：

十三届全国政协民族和宗教委员会持续关注民族地区草原生态环境保护工作，深入开展调研和协商议政，积极助推民族地区绿色发展。2022年4月，贵校草业与草原学院董世魁教授应邀参加民宗委组织的协商座谈会，对加强草原保护工作提出意见建议，部分意见被纳入全国政协常委会会议大会发言，得到刘鹤副总理的重要批示。7月，董世魁教授应邀参加全国政协领导同志率队赴西藏开展的实地调研，调研期间提出很多真知灼见，调研报告相关建议被生态环境部、国家林草局采纳。11月，董世魁教授协助提供草原生态保护相关的社情民意信息4篇，通过政协信息渠道予以反映，有效发挥了专家智库的作用。

在此，向贵校对全国政协民宗委工作的大力支持表示衷心感谢！希望今后继续得到贵校大力支持，共同为党和国家事业发展作出新贡献。

全国政协民族和宗教委员会办公室

2022年12月28日

中国人民政治协商会议全国委员会

感谢信

北京林业大学：

十四届全国政协民族和宗教委员会持续关注民族地区草原生态环境保护工作，邀请贵校草业与草原学院董世魁教授协助提供3份草原保护工作方面的材料，通过政协提案的形式报送有关部门。其中，《适时启动草原普查的建议》提案得到中央领导同志批示，自然资源部、国家林草局高度重视，召开部长专题会研究启动全国森林草原普查工作，拟提请以国务院名义部署该项工作，力争用2年左右时间查清森林草原分布、结构、数量和质量，解决草原底数不清问题。

在此，向贵校对全国政协民宗委工作的大力支持表示衷心感谢！希望今后继续得到贵校大力支持，共同为党和国家事业发展作出新贡献。

全国政协民族和宗教委员会办公室

2023年12月5日



农民日报社

证明

兹证明北京林业大学草业与草原学院院长董世魁教授，深度参与采写的农民日报第446期《上送件》——《陆海农业：中国农业现代化的新趋向》，获得国务院副总理胡春华的重要批示：“请农业农村部参阅”；农业农村部部长唐仁健批示：“由规划司牵头，国合与畜牧司共同办理”；农业农村部副部长邓小刚、马有祥均有批示。

特此证明。



为表彰在促
进科学技术进步
工作中做出重大
贡献，特颁发此
证书。

获奖项目: 青藏高原退化草地诊断和恢复
技术体系构建与应用

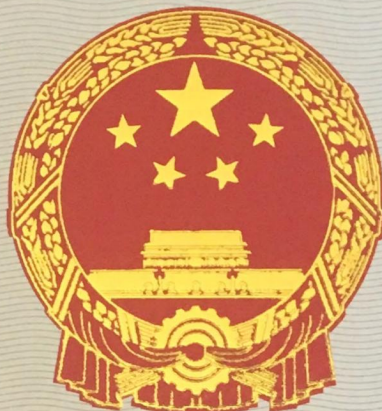
获 奖 者: 董世魁(第1完成人)

奖励等级: 科学技术进步奖一等奖

奖励日期: 2016年2月

证 书 号: 2015-169





青海省科学技术奖励 证书

为表彰青海省科学技术进步奖
获得者，特颁发此证书。

项目名称：高寒草地健康定量评价及生产-生态功能
提升技术集成与示范

获奖等级：一等奖

获奖者：董世魁



获奖编号：2017-KJJB-1-2-R4



青海省科学技术奖励 证书

为表彰青海省自然科学奖
获得者，特颁发此证书。

项目名称：青海省高寒草地生态系统对气候变化的响应
与生态适应机制

获奖等级：一等奖

获奖者：董世魁



获奖编号：2021-ZRKX-1-1-R03



梁希林业科学技术奖 科技进步奖 证书

为表彰梁希林业科学技术奖获得者，特
颁发此证书。

项目名称：青藏高原高寒草地生物多样性保护理论与技术

奖励等级：二等

获奖者：董世魁



证书号：2022-KJJ-2-06-R01

证书

董世魁 同志：

为了表彰您在 农业技术 领域作出的突出贡献，特决定发给政府特殊津贴并颁发证书。

政府特殊津贴(专业技术人才)第2023012244号



二〇二三年十二月二十三日

董世魁获国务院特殊津贴



证书

授予：董世魁

“北京市先进工作者”

称号



中共北京市委 北京市人民政府

2025年4月

董世魁获北京市先进工作者

SIDE EVENT FOR UNCCD COP16

Restoring degraded grasslands to combat desertification in dry areas

DECEMBER 7, 2024 | 15:00-16:30 PM
📍 IUCN Pavilion B07, Riyadh

Grassland degradation is a key cause of land desertification in dry areas on the Earth. In this side event, different stakeholders' voices heard, worldwide lessons learned, global experiences shared to restore the degraded grasslands for meeting UNCCD's and SDG's goals for environment protection and livelihood improvement. Welcome to join this side event.



CHAIRPERSON

Shikui DONG

Chair, IUCN-CEM Northeast Asia Region
Dean and Professor, School of Grassland
Science, Beijing Forestry University



KEYNOTE SPEAKERS

Zhi YANG

Deputy Director of Grassland Management
Department, National Forestry and Grassland
Administration of China



Jonathan DAVIES

Independent Consultant,
Agricultural Economics & Ecology

SPEAKERS & PANELISTS

Mounir LOUHAICHI, Thematic Research Leader Rangeland Ecology and Forages, International Center for Agricultural Research in the Dry Areas (ICARDA)

Sargai SHA, Inner Mongolia Conservation Manager, The Nature Conservancy

Jinhong GUAN, Associate Professor, College of Life Science, Qinghai Normal University

Xiangyin TUO, General Manager, Ningxia Yuan Sheng LV Yang Forest and Grassland Ecological Engineering Co., Ltd.



SIDE EVENT FOR UNCCD COP16

Valuing Grasslands

Multi-functional Landscapes for Biodiversity, Livelihoods and Climate

DECEMBER 6, 2024 | 9 - 10:30 AM
📍 MET-08, Riyadh

In-person only



KEYNOTE

Professor Shikui Dong

Dean, School of Grasslands
Beijing Forestry University



MODERATOR

Fiona Flintan

Senior Scientist, Rangelands
& Pastoralism
ILRI

The most extensive natural communities on earth, healthy grasslands and rangelands are essential to meet UNCCD's land degradation neutrality goal, several SDG's, and global climate and biodiversity targets. Join us to connect with leaders in grassland conservation and to listen and share perspectives on the many values of these ecosystems.

SPEAKERS & PANELISTS

Joao Campari, Global Leader, Food Practice, WWF International

Una Jones, CEO & Founder, Sustainable Fiber Alliance

Ken Otieno, Executive Director RECONCILE, Co-Facilitator Rangelands and Pastoralists Platform Africa

Sargai Sha, Inner Mongolia Conservation Manager, The Nature Conservancy

Geoffroy Citegetse, East Atlantic Flyway Initiative Manager, BirdLife International

Leigh Winowiecki, Research Leader: Soil and Land Health Theme, CIFOR-ICRAF; Soil and Land Health Research Lead, World Agroforestry



北京市普通高等学校

优秀毕业生

荣誉证书

牛启尘 同学：

系北京林业大学（学校）

草学专业2025届博士毕业生，

在校学习期间，德智体美劳全面发展，被评为优秀毕业生。

特发此证，以资鼓励。

北京市教育委员会
2025年06月16日

证字第202510022y123号

北京市普通高等学校

优秀毕业生

荣誉证书

左慧 同学:

系 北京林业大学 (学校)

草学 专业 2025 届 博士 毕业生,

在校学习期间,德智体美劳全面发展,被评为优秀毕业生。

特发此证,以资鼓励。

北京市教育委员会

2025 年 06 月 16 日

证字第 202510022y125 号

北京市普通高等学校

优秀毕业生

荣誉证书

顾启元 同学：

系 北京林业大学 (学校)

农艺与种业 专业 2025 届 硕士 毕业生，

在校学习期间，德智体美劳全面发展，被评为优秀
毕业生。

特发此证，以资鼓励。



证字第 202510022y122 号



中国国际大学生创新大赛（2025）

北京赛区

获奖证书

一等奖

项 目 名 称： 植此青绿——青藏高原退化草地生态修复技术引领者

项目负责人： 杜安娜

项 目 成 员： 王宇涵、梁心茹、关淇匀、刘硕、张敏、张宇豪、
张然、张珂、刘子龙、贾雪鹏、杜金珂、宋喜萍

指 导 老 师： 董世魁、杨珏婕、李颖

推 荐 学 校： 北京林业大学

在中国国际大学生创新大赛（2025）北京赛区荣获一等奖。

编号： 2025200020





CERTIFICATE

This certifies that

Runfu Li

has successfully obtained poster award of
the 1st International Symposium on Sustainable Crop and Pasture Systems

2024-08-23

DATE

張福發

王波

王波

SIGNATURE

国际草地生态会议：气候变化与适应

全球变化显著影响了草地生态系统的功能和过程。联网实验是探索全球变化在区域和全球尺度上影响的强大工具，其中 Nutrient Network、Drought Net 和 NPKD 等全球联网实验研究极大提升了我们对富营养化、干旱及其相互作用影响的理解。为进一步促进各网络站点的合作，为全球草地生态学家搭建合作的桥梁，北京林业大学草业与草原学院将于 2024 年 10 月 10 日至 12 日在北京主办“国际草地生态学会议暨干旱网络研讨会”。会议将邀请国内外草地生态学及全球变化领域的知名专家学者，共同探讨草地生态系统对全球变化的响应机制及适应策略，助力解决全球环境挑战和生态可持续发展问题。诚挚邀请相关领域的专家、学者及研究生积极参与，共同推动草地生态学的前沿研究与实践。本次会议限额 200 人，额满为止。

1. 大会主题

全球变化与草地生态系统

2. 组织机构

主办单位

北京林业大学

承办单位

北京林业大学草业与草原学院

内蒙古科尔沁草原生态系统国家生态定位观测研究站

协办单位

中国草学会草地管理专业委员会

中国草学会草地生态专业委员会

中国生态学学会长期生态学专业委员会

农牧交错带草地保护国家创新联盟

Grass and Forage Science 杂志

南京农业大学草业学院

国际草地生态学会会议-青年学者论坛日程

2024 年 10 月 11 日 星期五 下午 北京林业大学学研大厦四层 B0402 室		
致辞（14:00-14:05）		
14:00-14:05	学院领导致辞	主持人： 庾强
合影（14:05-14:10）		
14:10-14:20	Enhancing Grassland Health: The Grazing vs. Mowing Interplay Nazim HASSAN 中国科学院沈阳应用生态研究所	主持人： 丁文利
14:20-14:30	Trophic Dynamics of Microbial communities, Soil Fauna, and multiple Plants in Qinghai Grasslands Muhammad NAUMAN 北京林业大学	
14:30-14:40	Transcriptional Changes Underlying the Degradation of Plant Community in Alpine Meadow Under Seasonal Warming Impact 牛启尘 北京林业大学	
14:40-14:50	Grazing exclusion enriches arbuscular mycorrhizal fungal communities and improves soil organic carbon sequestration in the alpine steppe of northern Tibet 唐玉 北京林业大学	
14:50-15:00	Straw residues incorporation and nitrogen addition facilitate soil organic carbon accumulation and vegetation recovery in saline-alkali degraded Songnen grassland Sehrish MAHROOF 东北师范大学	主持人： 张兵
15:00-15:10	Precipitation change and nutrient addition effects on productivity across China grasslands Hamid ATUNWA 北京林业大学	
15:10-15:20	Growth and physiological metabolic regulation mechanisms of the dominant plant Leymus secalinus in alpine meadow under nitrogen deposition 左慧 北京林业大学	
15:20-15:30	Nitrogen level determines arbuscular mycorrhizal fungi nitrogen uptake rate of Stipa purpurea in alpine steppe 孙佳慧 北京林业大学	

研究生左慧参加国际学术会议

茶歇（15:30-15:50）		
15:50-16:00	The Impact of Mixed Cattle-Sheep Grazing on Community Assembly Processes and Its Consequences for Multiscale Plant Diversity 岳永襄 东北师范大学	主持人： 李周园
16:00-16:10	The Effects of Grazing Stress on Mesofauna Abundance and Diversity in Degraded and Restored Alpine Meadows Mohamed Koiva KALLON 北京林业大学	
16:10-16:20	Short-term grazing changed temporal productivity stability of alpine grassland on Qinghai-Tibetan Plateau via response species richness and functional groups asynchrony 赫凤彩 北京林业大学	
16:20-16:30	Earthworm Traits, Environmental Factors, and Field Management Alter the Impact of Earthworms on Phosphorus Dynamics at the Soil-Plant Interface: A Meta-Analysis 王子玥 北京林业大学	
16:30-16:40	Stoichiometric homeostasis predicts ecosystem functioning under environmental changes 顾倩 北京林业大学	主持人： 郭倩倩
16:40-16:50	Extraction efficiencies of soil exchangeable calcium determined by extractants rather than extraction principle 王著峰 中国农业科学院农业资源与农业区划所	
16:50-17:00	Vital Role of Asymbiotic Diazotrophs in Nitrogen Input Across the Alpine Grasslands on the Qinghai-Tibetan Plateau 张珂 北京林业大学	
17:00-17:10	A hierarchical classification framework for mapping grassland types using multisource earth observation data 张敏 北京林业大学	
晚餐（17:30-19:00） 北京林业大学楸木园餐厅（东区三层）		

研究生赫凤彩、张珂参加国际学术会议

Article

Contrasting drought sensitivity of Eurasian and North American grasslands

<https://doi.org/10.1038/s41586-024-08478-7>

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Qiang Yu^{1,2}, Chong Xu^{3,4}, Honghui Wu^{3,4}, Yuguang Ke⁵, Xiaolan Zuo⁶, Wentao Luo⁷, Haiyan Ren⁸, Qian Gu¹, Hongqiang Wang⁵, Wang Ma⁷, Alan K. Knapp⁹, Scott L. Collins¹⁰, Jennifer A. Rudgers¹⁰, Yiqi Luo¹¹, Yann Hautier¹², Chengjie Wang¹³, Zhengwen Wang⁷, Yong Jiang¹⁴, Guodong Han¹³, Yingzhi Gao^{15,16}, Nianpeng He¹⁷, Juntao Zhu¹⁸, Shikui Dong¹, Xiaoping Xin^{3,5}, Guirui Yu¹⁸, Melinda D. Smith⁹✉, Linghao Li¹⁹ & Xingguo Han^{14,19}✉

Extreme droughts generally decrease productivity in grassland ecosystems^{1–3} with negative consequences for nature’s contribution to people^{4–7}. The extent to which this negative effect varies among grassland types and over time in response to multi-year extreme drought remains unclear. Here, using a coordinated distributed experiment that simulated four years of growing-season drought (around 66% rainfall reduction), we compared drought sensitivity within and among six representative grasslands spanning broad precipitation gradients in each of Eurasia and North America—two of the Northern Hemisphere’s largest grass-dominated regions. Aboveground plant production declined substantially with drought in the Eurasian grasslands and the effects accumulated over time, while the declines were less severe and more muted over time in the North American grasslands. Drought effects on species richness shifted from positive to negative in Eurasia, but from negative to positive in North America over time. The differing responses of plant production in these grasslands were accompanied by less common (subordinate) plant species declining in Eurasian grasslands but increasing in North American grasslands. Our findings demonstrate the high production sensitivity of Eurasian compared with North American grasslands to extreme drought (43.6% versus 25.2% reduction), and the key role of subordinate species in determining impacts of extreme drought on grassland productivity.

The severity and frequency of extreme climate events have increased substantially due to global environmental change, often with devastating consequences⁸. For example, extreme droughts can cause widespread damage to regional economies, environments and human health^{9,10}. Previous studies have shown that extreme droughts can have profound impacts on ecosystem functioning¹¹, such as substantially reducing plant productivity^{1,3,6,7}—a fundamental component of the global carbon cycle^{5,12}. As climate models predict future increases in the probability of multi-year extreme drought events in many regions of the world^{9,13,14}, there is a pressing need to understand their impacts on ecosystem function. Such understanding is crucial for accurate

assessments of ecosystem resistance to climate change, as well as for the provisioning of ecosystem services.

Theoretical studies have put forward two different hypotheses regarding the response of ecosystem productivity to multi-year extreme drought: the stress-accumulation hypothesis suggests that the negative effects of drought increase with duration; and the drought-acclimatization hypothesis postulates that the negative effects of drought stabilize or even diminish with duration^{15,16}. Although multi-year extreme drought experiments are relatively rare, their results provide support for both theories. For example, in a semi-arid grassland in China, drought impact was accumulative³,

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Aridity modulates grassland biomass responses to combined drought and nutrient addition

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 Check for updates

A list of authors and their affiliations appears at the end of the paper

Plant biomass tends to increase under nutrient addition and decrease under drought. Biotic and abiotic factors influence responses to both, making the combined impact of nutrient addition and drought difficult to predict. Using a globally distributed network of manipulative field experiments, we assessed grassland aboveground biomass response to both drought and increased nutrient availability at 26 sites across nine countries. Overall, drought reduced biomass by 19% and nutrient addition increased it by 24%, resulting in no net impact under combined drought and nutrient addition. Among the plant functional groups, only graminoids responded positively to nutrients during drought. However, these general responses depended on local conditions, especially aridity. Nutrient effects were stronger in arid grasslands and weaker in humid regions and nitrogen-rich soils, although nutrient addition alleviated drought effects the most in subhumid sites. Biomass responses were weaker with higher precipitation variability. Biomass increased more with increased nutrient availability and declined more with drought at high-diversity sites than at low-diversity sites. Our findings highlight the importance of local abiotic and biotic conditions in predicting grassland responses to anthropogenic nutrient and climate changes.

Nutrient inputs and extreme droughts are increasing in terrestrial ecosystems worldwide owing to global changes^{1,2}, even in already colimited grasslands where plant growth is constrained by water and nutrients^{3,4}. Resource supplies (for example, nutrient availability or soil moisture) often affect grasslands, causing increases (for example, nutrient addition) and reductions (for example, drought) in aboveground biomass^{5–8}. Combined effects of drought and nutrient increases can yield a proportional impact, equivalent to the sum of their individual effects. However, non-proportional effects resulting in higher or lower responses than this sum can arise when one factor exacerbates or diminishes the effect of the other (for example, nutrient addition intensifying the impact of drought, and drought reducing nutrient-use efficiency)⁹. Nutrients can also buffer the impacts of drought, especially in colimited grasslands¹⁰. Variations in responses depend on soil water availability¹¹, the plant community¹² and species-specific stoichiometric

needs for water and nutrients¹³. Thus, nutrient addition can shift plant community interactions¹⁴, affecting drought sensitivity¹⁵, and drought can reduce productivity, diminishing nutrient sensitivity¹⁶. Understanding the mechanisms underlying these effects is crucial for predicting responses to climate-change-induced increases in drought frequency and nutrient availability.

Biotic factors such as plant richness and species abundance¹⁷, along with abiotic factors including water availability, interannual precipitation variability and soil texture, contribute to different responses to drought and nutrient addition¹⁸. Aridity critically modulates the responses of plant species to these factors¹⁹. In arid grasslands, water is the primary limiting factor, heightening drought sensitivity^{6,20}, whereas subhumid grasslands are mainly colimited by nutrient and water availability, and humid grasslands are typically limited by nutrients or light². High plant diversity and different functional groups may

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Author contributions

Y.H. and Q.Y. developed and framed the research question. Y.H., A.J., Q.Y., L.Y., E.T.B., E.W.S. and M.D.S. coordinated the NPK-D Net collaboration. V.F.B. and C.X. led the writing of the paper. V.F.B., G.R.O. and H.D. analysed data. C.X., P.W., J.A., M.C., A.K., S.A.P., T.O. and L.B. contributed to data analysis. P.W., L.Y., Q.Y., E.T.B., A.J., E.W.S., J.A., G.R.O., H.D., M.C., A.K., S.A.P., N.E., F.I., H. Auge, M.H.C., A.C.C., P.D., T.F., A.C.G., S.E.K., T.O., P.P., A.P., D.S., M.T., A.V., E.V., G.M.W., C.W. and G.R.W. contributed to writing the paper. V.F.B., C.X., A.J., J.A., M.C.,

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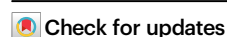
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Core microbes regulate plant-soil resilience by maintaining network resilience during long-term restoration of alpine grasslands

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The alpine grasslands of the Qinghai-Tibetan Plateau (QTP), the world's highest plateau, have been severely degraded. To address this degradation, human-involved restoration efforts, including grassland cultivation, have been implemented. However, the impact of these practices on soil microbial community stability and its relationship with plant-soil system resilience has not been explored. In this study, we evaluate the effects of grassland restoration on microbial communities. We show that bacteria demonstrate higher composition resistance and resilience during the restoration process, when compared to fungi. The changes we observe in microbial community interactions support the stress gradient hypothesis. Our results emphasize the synergistic role of network resilience and the restoration of the plant-soil system. Importantly, we find that core microbial species significantly influence the resilience of the plant-soil system by sustaining the co-occurrence networks. These insights underscore the critical roles of microbial communities in grassland restoration and suggest new strategies for boosting grassland resilience by safeguarding core microbes.

The grasslands of the Qinghai-Tibetan Plateau (QTP), the highest plateau in the world, are crucial for food supply, environmental conservation, and social development¹. However, these alpine grassland ecosystems have undergone significant degradation in recent decades due to various drivers, including climate change, overgrazing, and anthropogenic interventions². Soil microorganisms, which encompass a diverse and intricate array of biological communities that play a crucial role in organic matter decomposition, nutrient cycling and maintaining soil functionality in grassland ecosystems³. Notably, soil bacteria and fungi respond differently to environmental filtering, thereby influencing the distribution and diversity of the soil microbial community^{4,5}. Mean annual temperature and aboveground net primary productivity are determining factors for changes in fungal diversity, soil pH, and N:P ratio are determining factors for changes in

bacterial diversity⁵. While the significance of microorganisms in restoring degraded grasslands is well-recognized, there remains a notable gap in research regarding the disparities in soil microbial diversity, the relationship between bacteria and fungi, as well as the complexity and stability of the microbiome. Addressing these knowledge gaps is crucial for developing effective strategies to restore and preserve the fragile alpine grassland ecosystems of the QTP.

The stability of an ecosystem in the face of disruption hinges on its resistance and resilience⁶. Referring to the concept of Griffiths⁷ and Gao⁸ et al., stability of microbial community can be defined as the ability of a microbial community's composition and network to resist environmental disturbances (resistance) and to recover to its original state after the disturbance is eliminated (resilience). Such stability is influenced not only by the composition of its community, but also by

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Review

The global potential for mitigating nitrous oxide emissions from croplands

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SUMMARY

Agricultural activities contribute almost half of the total anthropogenic nitrous oxide (N₂O) emissions, but proper assessment of mitigation measures is hampered by large uncertainties during the quantification of cropland N₂O emissions and mitigation potentials. This review summarizes the up-to-date datasets and approaches to provide spatially explicit and crop-specific assessment of the global mitigation potentials. Here, we show that global cropland N₂O emissions have quadrupled to 1.2 Tg N₂O-N year⁻¹ over 1961–2020. The mitigation potential is 0.7 Tg N₂O-N without compromising the crop production, with 86% from optimizing nitrogen fertilization, three-quarters (78%) from maize (22%), vegetables, and fruits (16%), other crops (15%), wheat (13%), and rice (12%), and over 80% from South Asia, China, the European Union, other American countries, the United States, and Southeast Asia. More accurate estimation of cropland N₂O mitigation potentials requires extending the N₂O observation network, improving modeling capacity, quantifying the feasibility of mitigation measures, and seeking additional mitigation measures.

INTRODUCTION

Nitrous oxide (N₂O) is a long-lived stratospheric ozone-depleting substance and greenhouse gas, which has a 100-year global warming potential 273 times higher than that of carbon dioxide.¹ The concentration of atmospheric N₂O has increased by more than 20% from 270 parts per billion (ppb) in 1750 to 331 ppb in 2018.^{2,3} Cropland is the largest contributor of anthropogenic N₂O emissions, accounting for approximately one-third of total anthropogenic N₂O emissions.² To sustain an increasing global population and the demand for food, N₂O emissions are projected to increase by 35%–60% between 2005 and 2030, largely driven by excessive use of synthetic nitrogen (N) fertilizers and manures to croplands.^{4–6} Reducing cropland N₂O emissions while maintaining crop production is thus conducive to achieving low levels of climate warming and preventing stratospheric ozone depletion. It is prerequisite to have a comprehensive understanding of cropland N₂O production mechanisms and an accurate assessment of cropland N₂O emissions.^{7,8}

Cropland N₂O emissions is a net result of N₂O production, reduction, transformation, and diffusion through the soil layers to the atmosphere,⁹ with each process controlled by various

abiotic and biotic factors. Microbial metabolic pathways account for approximately 70% of global N₂O emissions, including microbial nitrification and denitrification.¹⁰ Key drivers of N₂O emissions influencing these processes include soil properties, climate conditions, agricultural management practices, and microbial communities.^{10–13} A fair amount of research has explored such key drivers of each specific process under various specific conditions primarily based on field experiments or laboratory incubations. However, the relative importance of each process to N₂O production under different environmental conditions remains largely unknown, which is a barrier for accurate estimation of cropland N₂O emissions.

Significant efforts have been made to quantify cropland N₂O emissions from the field to regional and global scales, albeit large uncertainties still exist.^{14,15} Uncertainties from direct measurements lie in a deficit of coverage for the developing countries, limited sampling frequency, replication, and lack of detailed records of site information (e.g., local microscale biophysical characteristics and management history).^{7,16} Large discrepancies also exist among cropland N₂O emission estimates derived from different approaches (e.g., statistical upscaling models, process-based models, and atmospheric inversion



Opinion

Phosphorus acquisition and pathogen defense: synergies versus trade-offs

Wenli Ding (丁文利)¹, Shikui Dong (董世魁)^{1,*}, and Hans Lambers ^{1,2,3,*}

During their life cycle, plants encounter simultaneous biotic and abiotic stresses. A low availability of inorganic phosphorus (P) commonly limits plant growth in natural and agricultural ecosystems. Pathogen attacks pose risks to plant productivity and biodiversity, causing yield loss and ecosystem degradation. Plants evolved various strategies to cope with P limitation, which, in turn, affect their resistance to pathogens. However, a comprehensive understanding of how efficient plant P-acquisition strategies influence their pathogen resistance under P-limited conditions remains elusive. We highlight how these P-acquisition strategies can enhance or decrease pathogen resistance through multiple mechanisms. We advocate using this information to design more sustainable agricultural systems and explain species turnover in natural ecosystems, especially in the context of global change.

The phosphorus-defense dilemma: how plants balance acquisition and protection via root traits and symbioses

Phosphorus (P) is an essential plant nutrient. However, its availability is impacted by its strong affinity for (hydr)oxides of aluminum (Al) and iron (Fe) in acid soils, as well as its precipitation as calcium (Ca)-P in alkaline soils [1]. Consequently, the plant-available form of P, inorganic P (P_i; orthophosphate) in the soil solution, is often limited in both natural and agricultural ecosystems in the absence of fertilization, thereby constraining plant productivity [2,3]. In response, plants have evolved various P-acquisition strategies, including root morphological, physiological, and metabolic traits and symbiosis with **arbuscular mycorrhizal fungi (AMF)** (see Glossary) [4–6]. Here, we classify these strategies as (i) **nonmycorrhizal P-acquisition strategies**, which refer to root morphological, physiological, and plant-mediated microbial traits that confer benefits for P uptake; and (ii) **mycorrhizal P-acquisition strategies**, which refer to the symbioses with AMF, **ectomycorrhizal fungi (ECM)**, or ericoid mycorrhizas that enhance P uptake.

Plants encounter a multitude of stresses in their environment. In addition to abiotic stresses such as nutrient limitations, they are also challenged by biotic stresses such as pathogen attack. Plant pathogens are microbes that exploit plants as sources of living space and nutrients and negatively affect plant survival, growth, and reproduction. These pathogens include bacteria, fungi, viruses, and oomycetes. Pathogenic microbes are pervasive, affecting every plant species and ecosystem [7–9]. To survive and reproduce, plants have evolved an immune system that enables them to counteract pathogen attack. Upon pathogen infection, plants strengthen physical barriers that impede fungal colonization, such as reinforcing cell integrity through mechanisms such as cell wall lignification and occluding xylem vessels with gums, gels, or tyloses [10,11]. Additionally, plants can release antimicrobial compounds, such as saponins, phytoalexins such as pisatin, phenolic compounds such as flavonoids, and defensins and enzymes that degrade

Highlights

Plants may be exposed to phosphorus (P) deficiency and pathogen attack simultaneously, and plant survival under P limitation depends largely on the ability to balance growth and defense.

Nonmycorrhizal P-acquisition strategies incur increased susceptibility to pathogens because of reduced physical protection and diminished release of defense-related products.

Mycorrhizal P-acquisition strategies enhance pathogen resistance through physical protection and release of defense-related products.

PHOSPHATE STARVATION RESPONSE protein (PHR) plays a central role in both P acquisition and plant defense.

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Convergent gut microbial functional strategies drive energy metabolism adaptation across Ursidae species and challenge the uniqueness of giant panda

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Abstract

The gut microbiota is a key regulator of host energy metabolism, but its role in seasonal adaptation and evolution of bears is still unclear. Although giant pandas are considered an extraordinary member of the Ursidae family due to their specialized herbivory and low metabolic rate, there is still controversy over whether the metabolic regulation mechanism of their gut microbiota is unique. This study analyzed the seasonal dynamics of gut microbiota in giant pandas (*Ailuropoda melanoleuca*), Asian black bears (*Ursus thibetanus*), brown bears (*Ursus arctos*), and polar bears (*Ursus maritimus*), and combined with fecal microbiota transplantation (FMT) experiments, revealed the following findings. The microbial composition of the four bear species is similar, with both *Firmicutes* and *Proteobacteria* dominating. The enrichment of *Firmicutes* in winter enhances lipid metabolism, and adapts to dietary differences, indicating the existence of convergent microbial functional strategies in the Ursidae family. Our results demonstrate that bear gut microbiota promoted seasonal adaptation. In FMT experiments, bear gut microbiota in winter may had stronger functional capabilities on regulating host energy metabolism in mice, and regulate host appetite to increase energy intake. Finally, despite feeding on bamboo, giant pandas microbiota driven energy metabolism pathways (such as SCFAs) are highly conserved compared to other bears, suggesting a deep commonality in the adaptability of bear microbiota in evolution. Therefore, this study challenges the traditional view of microbial uniqueness of giant pandas, and emphasizes the co-evolutionary mechanism of energy metabolism adaptation in bear animals through microbial plasticity. In the future, it is necessary to integrate wild samples to eliminate the interference of captive diet and further analyze the genetic basis of host gut microbiota interactions.

Keywords: Ursidae; gut microbiota; FMT; energy metabolism; season

Introduction

Seasonal fluctuations in mammalian energy metabolism are adaptive responses to cyclic environmental resource variations, involving dynamic equilibria between food availability and energy allocation (e.g. thermoregulation and reproduction). Ursidae, as a lineage with diversified energy strategies, exhibit metabolic patterns tightly linked to ecological behaviors. Active species (e.g. brown bears, and Asian black bears) require sustained high-energy intake due to elevated activity levels, whereas low-metabolism species (e.g. giant pandas) adapt to resource constraints through behavioral adjustments (e.g. reduced locomotion) [1]. Current studies reveal two core strategies for ursids to cope with energy stress in the cold environment. Hibernation-type: brown bears and black bears accumulate fat via hyperphagia in summer and reduce metabolic rates (body temperature drops by 30%–50%) during hibernation to conserve energy [2, 3]. This process involves phase-specific

activation of lipogenesis-related genes to ensure efficient lipid utilization [4]. Continuous metabolism-type: non-hibernators like polar bears rely on insulated fur to minimize heat loss [5], whereas giant pandas maintain energy homeostasis by enhancing thermogenesis (e.g. TRPM8 inhibition-mediated cold tolerance) and microbial-driven cellulose fermentation [6]. Giant pandas lack endogenous cellulase genes [7] but depend on gut microbiota for bamboo fiber degradation [8], suggesting microbial compensation in energy provision.

The gut microbiota, acting as a “second genome” for host metabolism, responds to environmental fluctuations through pathways such as short-chain fatty acid (SCFA) synthesis and lipid metabolism regulation [9]. For instance, hibernation-associated gut microbiota remodeling in brown bears sustains host lipid homeostasis [4], whereas seasonal dietary shifts (carnivory to herbivory) in polar bears significantly alter microbial composition [10]. However, current research on ursid microbial

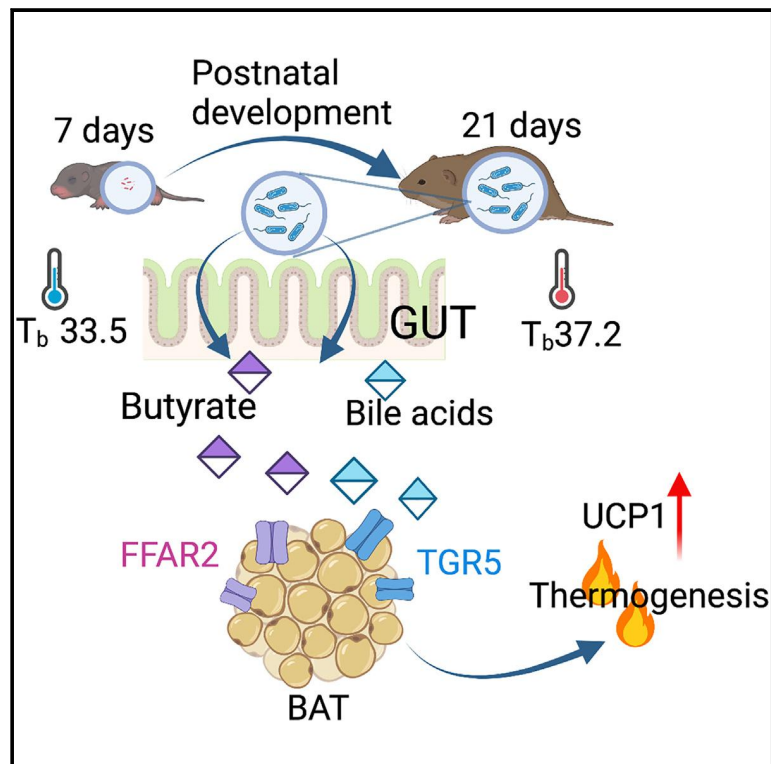
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Role of gut microbiota in the postnatal thermoregulation of Brandt's voles

Graphical abstract



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In brief

Bo et al. use antibiotics to interfere with the establishment of gut microbiota during the development of Brandt's voles and determine their thermogenic development and regulatory pathways. They show a relationship between the gut microbiota and the thermogenesis of rodent pups and expand the mechanism of postnatal development of thermogenesis in small mammals.

Highlights

- Gut microbiota promote the development of thermoregulation
- Butyric acid and bile acid participate in the thermoregulation of pups
- These results expand the mechanism of postnatal development of thermogenesis in mammals



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Does bumblebee preference of continuous over interrupted strings in string-pulling tasks indicate means-end comprehension?

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Abstract Bumblebees (*Bombus terrestris*) have been shown to engage in string-pulling behavior to access rewards. The objective of this study was to elucidate whether bumblebees display means-end comprehension in a string-pulling task. We presented bumblebees with two options: one where a string was connected to an artificial flower containing a reward and the other presenting an interrupted string. Bumblebees displayed a consistent preference for pulling connected strings over interrupted ones after training with a stepwise pulling technique. When exposed to novel string colors, bees continued to exhibit a bias towards pulling the connected string. This suggests that bumblebees engage in featural generalization of the visual display of the string connected to the flower in this task. If the view of the string connected to the flower was restricted during the training phase, the proportion of bumblebees choosing the connected strings significantly decreased. Similarly, when the bumblebees were confronted with coiled connected strings during the testing phase, they failed to identify and reject the interrupted strings. This finding underscores the significance of visual consistency in enabling the bumblebees to perform the task successfully. Our results suggest that bumblebees' ability to distinguish between continuous strings and interrupted strings relies on a combination of image matching and associative learning, rather than means-end understanding. These insights contribute to a deeper understanding of the cognitive processes employed by bumblebees when tackling complex spatial tasks.

eLife assessment

This study provides **valuable** new insights into insect cognition and problem-solving in bumblebees. The authors present **convincing** evidence that bumblebees lack causal understanding in a string-pulling task, and find support for bumblebees instead using image-matching for this task.

证书号第 4496710 号



发明专利证书

发明名称：一种基于无人机技术的大型濒危野生动物监测的方法

发明人：董世魁;苏旭坤;刘世梁

专利号：ZL 2014 1 0326404. X

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专利权人：北京师范大学

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证书号第 17311385 号



实用新型专利证书

实用新型名称：一种草地保护栅栏

发 明 人：沈豪;董世魁

专 利 号：ZL 2021 2 3097676.1

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专 利 权 人：北京林业大学

地 址：100083 北京市海淀区清华东路 35 号

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证书号第 9482568 号



实用新型专利证书

实用新型名称：一种工业排放气体采样装置

发 明 人：沈豪;董世魁

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专 利 权 人：北京师范大学

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