



生态学报

ACTA ECOLOGICA SINICA

第45卷 第3期 Vol.45 No.3 2025 ISSN 1000-0933 CN 11-2031/Q



中国生态学会
中国科学院生态环境研究中心

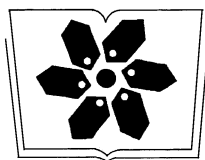
主办



科学出版社
Science Press

出版

生态知识库
Eco-Environmental
Knowledge Web



中国科学院科学出版基金资助出版

生态学报

(SHENGTAI XUEBAO)

第 45 卷 第 3 期 2025 年 2 月 (半月刊)

目 次

专论与综述

- 旅游生态安全研究现状、评述与展望 周 彬, 朱宇辰, 虞 虎, 等 (1049)
- 土地荒漠化及其恢复过程土壤动物生态学研究进展 郑成卓, 李玉强, 王旭洋, 等 (1059)
- 低覆盖度治沙理论及实践 邹 慧, 杨文斌, 朱 斌, 等 (1070)

研究论文

- 模拟大气沉降氮在陆地生态系统中的留存及其影响因素 邓 旭, 王丽娜, 周 莹, 等 (1077)
- LUCC 多情景模拟下黄土沟壑区流域径流响应规律及其适应性规划对策——以晋西三川河流域为例
..... 雷泽鑫, 罗俊杰, 张文正, 等 (1090)
- 多源土地利用数据下景观格局对径流-泥沙影响的不确定性——以鄱阳湖区虎山流域为例
..... 魏 冲, 董晓华, 马耀明, 等 (1102)
- 基于玻尔兹曼熵的延河流域景观格局复杂度计算及生态可持续性分析 曹伊婷, 赵红蕊, 刘欣桐 (1116)
- 基于综合评价指数的塔里木盆地荒漠化风险评估 席 磊, 冯益明, 戚 墨, 等 (1126)
- 京杭大运河江苏段生态系统服务与经济协调发展的耦合协调研究 徐彩瑶, 曹露丹, 汪婧宇, 等 (1137)
- 长江经济带生态旅游效率时空演化及组态提升路径 刘亦文, 王培茜 (1154)
- 河南省生态经济耦合协调度时空分析 李睿锴, 王 冠, 赵宗泽, 等 (1172)
- 考虑社会-经济-生态损失的重大水电工程系统可持续性分析 井沛然, 盛金保, 胡铁松, 等 (1184)
- 基于核归一化植被指数的中国西部四省自然保护区保护成效评估 钟超慧, 陈甲豪, 杨 涵, 等 (1199)
- 融合生态安全格局和基于自然解决方案的山水林田坝草一体化保护和系统治理
..... 王腾雯, 程俊豪, 熊 航, 等 (1210)
- 三江源国家公园水源涵养服务时空演变特征及其驱动因素 陶洁怡, 章锦河, 郭丽佳, 等 (1226)
- 北京山区森林生态系统水源涵养功能沿海拔梯度的空间变异 张祯尧, 陈思瑾, 张振明, 等 (1239)
- 极端生态环境水循环关键参量监测设备与物联网监测系统研制和示范
..... 刘绍民, 徐自为, 黄晓东, 等 (1251)
- 中小城市家庭交通和饮食选择的碳排放差异——以山东省滨城区为例 宋子康, 黄甘霖 (1261)
- “双碳”目标下京津冀地区碳足迹变化及其影响因素 颜建军, 邓 楠, 陈 彬, 等 (1275)
- 双碳目标下乌鲁木齐市碳氧平衡估算与影响因素分析 汪托弟, 徐丽萍, 李智慧, 等 (1289)
- 珠三角城市群净碳排放与经济发展脱钩效应及其驱动力 王永阳, 蔡宴朋, 张 盼 (1303)
- 中国道路交通碳排放驱动因素及碳达峰 王 硕, 徐艺诺, 翁大维, 等 (1315)

施用氮肥对农田土壤有机氮组分的影响整合分析·····	章 梦,王晨颖,罗 松,等 (1328)
基于立地、土壤养分及其交互作用的湖南杉木人工林立地指数模型·····	刘俊成,朱光玉,吕 勇 (1339)
黄土高原不同密度刺槐林地土壤-微生物-胞外酶生态化学计量特征 ·····	黄浩博,毕华兴,赵丹阳,等 (1351)
基于 Landsat 影像评估鸡足山火烧迹地近 40 年植被恢复动态·····	苏维翰,张楚然,邓 云,等 (1362)
外来入侵种地中海大麦在中国的潜在适生区预测·····	苏 静,李海洋,王 瑞,等 (1379)
青藏高原种子植物区系多样性格局及其影响因素·····	钟静怡,叶采金,吴浩静,等 (1389)
小尺度森林生态产品总值评估——以泰顺县司前畲族镇为例·····	李同欣,陈俊昊,竹京玲,等 (1406)
河西走廊荒漠绿洲过渡带沙丘不同固定阶段泡泡刺叶性状特征·····	何 浩,李 瑞,王红永,等 (1417)
土著 AM 真菌接种对古银杏实生苗生长和生理特性的影响·····	阳雅荧,毛洁莹,陈保冬,等 (1429)
黄土高原不同降水量带退耕草地生物结皮的斑块特征和分布格局·····	吉静怡,赵允格,王闪闪,等 (1444)
大豆叶绿素分子光能吸收特性·····	康华靖,李进省,王复标,等 (1454)
青藏高原东缘城市蚂蚁群落体色对区域气候的生态响应·····	苏秋海,罗昕裕,尹如意,等 (1464)
贺兰山东麓荒漠草原地面节肢动物群落结构分布特征 ·····	郭志霞,刘任涛,赵文智 (1472)
育雏期杂色山雀对不同类型巢捕食者的应对行为策略·····	杨金玉,封德全,万冬梅,等 (1486)
基于无人机低空遥感影像分析的布氏田鼠冬季洞群空间分布特征及其影响因子·····	····· 杜波波,冀 超,王大伟,等 (1494)

学术信息与动态

机器学习在生态安全领域中的应用综述·····	孟德惠,孙 适,吴远翔,等 (1503)
------------------------	----------------------

期刊基本参数:CN 11-2031/Q * 1981 * m * 16 * 470 * zh * P * ¥ 120.00 * 1510 * 38 * 2025-02



封面彩图提供: 陈春波 中国科学院新疆生态与地理研究所 E-mail:ccb_8586@ms.xjb.ac.cn

ACTA ECOLOGICA SINICA Vol.45, No.3 February, 2025 (Semimonthly)

CONTENTS

Review and Monograph

- Current state, critical review and future prospects of research on tourism ecological security ZHOU Bin, ZHU Yuchen, YU Hu, et al (1049)
- Advances in soil fauna ecology in the process of land desertification and its restoration ZHENG Chengzhuo, LI Yuqiang, WANG Xuyang, et al (1059)
- Low-coverage desertification control: theory and practice ZOU Hui, YANG Wenbin, ZHU Bin, et al (1070)

Research Paper

- Modeling the retention of atmospheric deposited nitrogen and influencing factors in terrestrial vegetation ecosystems DENG Xu, WANG Lina, ZHOU Ying, et al (1077)
- Response pattern of watershed runoff in loess gully area under LUCC multi-scenario simulation and its adaptive planning strategy: a case study of Sanchuan River Basin in west of Shanxi Province ... LEI Zexin, LUO Junjie, ZHANG Wenzheng, et al (1090)
- Uncertainty analysis on the effects of landscape pattern on runoff and sediment using multi-source land use data: a case study in the Hushan River Basin of the Poyang Lake Regions WEI Chong, DONG Xiaohua, MA Yaoming, et al (1102)
- Calculation of landscape complexity and analysis of ecological sustainability in the Yanhe watershed based on Boltzmann entropy CAO Yiting, ZHAO Hongrui, LIU Xintong (1116)
- Risk assessment of desertification in Tarim Basin based on Comprehensive Evaluation Index XI Lei, FENG Yiming, QI Zhao, et al (1126)
- The coupling and coordination relationship between ecosystem services and economic development in the Jiangsu section of the Beijing-Hangzhou Grand Canal and its contribution/obstacle factors identification XU Caiyao, CAO Ludan, WANG Jingyu, et al (1137)
- Spatio-temporal evolution of ecotourism efficiency in the Yangtze River Economic Belt and the path of group enhancement LIU Yiwen, WANG Yuqian (1154)
- Spatiotemporal analysis of ecological and economic coupling coordination degree in Henan Province LI Ruikai, WANG Guan, ZHAO Zongze, et al (1172)
- Sustainability analysis of hydropower megaproject system incorporating the social-economic-ecological losses JING Peiran, SHENG Jinbao, HU Tiesong, et al (1184)
- Assessment of conservation effectiveness in nature reserves of four provinces in western China based on kernel Normalized Difference Vegetation Index data ZHONG Chaohui, CHEN Jiahao, YANG Han, et al (1199)
- Integrated conservation and systematic management of mountain-river-forest-farmland-dam-grass based on the ecological security pattern and Nature-based Solutions (NbS) WANG Tengwen, CHENG Junhao, XIONG Hang, et al (1210)
- Spatiotemporal change and driving factors of water conservation in Sanjiangyuan National Park TAO Jieyi, ZHANG Jinhe, GUO Lijia, et al (1226)
- Spatial patterns of forest water conservation function along an elevation gradient in the Beijing mountain area ZHANG Zhenyao, CHEN Sijin, ZHANG Zhenming, et al (1239)
- Development and demonstration of key parameter monitoring equipment and IoT monitoring system for water cycle in extreme ecological environments LIU Shaomin, XU Ziwei, HUANG Xiaodong, et al (1251)
- Study on carbon emission differences of urban households' transportation and diet choices in small and medium-sized cities: a case study of Bincheng District in Shandong Province SONG Zikang, HUANG Ganlin (1261)
- Study on carbon footprint changes and influencing factors in Beijing-Tianjin-Hebei region under the "dual-carbon" goal YAN Jianjun, DENG Nan, CHEN Bin, et al (1275)
- Estimation of carbon and oxygen balance and analysis of influencing factors in Urumqi city under the goal of double carbon WANG Tuodi, XU Liping, LI Zhihui, et al (1289)

- Decoupling effect and driving factors of net carbon emissions and economic development in the Pearl River Delta urban agglomeration WANG Yongyang, CAI Yanpeng, ZHANG Pan (1303)
- Driving factors and peak analysis of road traffic carbon emissions in China WANG Shuo, XU Yinuo, WENG Dawei, et al (1315)
- Influences of nitrogen fertilization on soil organic nitrogen components in agroecosystems: a meta-analysis ZHANG Meng, WANG Chenying, LUO Song, et al (1328)
- Site index model of Chinese fir plantation in Hunan province based on site, soil nutrients and their interactions LIU Juncheng, ZHU Guangyu, LÜ Yong (1339)
- Ecological stoichiometry of soil, microbial biomass, and extracellular enzyme in *Robinia pseudoacacia* with different stand densities in the Loess Plateau, China HUANG Haobo, BI Huaxing, ZHAO Danyang, et al (1351)
- Assessment of vegetation recovery dynamics over nearly 40 years in the Jizu Mountain burnt area based on Landsat imagery SU Weihai, ZHANG Churan, DENG Yun, et al (1362)
- Prediction of potential suitable areas for *Hordeum murinum* subsp. *leporinum* as an emerging invasive plant in China SU Jing, LI Haiyang, WANG Rui, et al (1379)
- Diversity patterns and influencing factors of seed plant flora in the Tibetan Plateau ZHONG Jingyi, YE Caijin, WU Haojing, et al (1389)
- Evaluation of gross forest ecosystem product on small scale: taking Siqian she ethnic town in Taishun county as an example LI Tongxin, CHEN Junhao, ZHU Jingling, et al (1406)
- Research on the leaf trait characteristics of *Nitraria sphaerocarpa* across different sand dune stabilization stages in the Hexi Corridor's desert-oasis transition zone HE Hao, LI Rui, WANG Hongyong, et al (1417)
- Effect of inoculation with indigenous AM fungi on growth and physiological characteristics of ancient *Ginkgo biloba* seedlings in Shanghai YANG Yaying, MAO Jieying, CHEN Baodong, et al (1429)
- Patch characteristics and distribution patterns of biocrusts in rehabilitated grassland under different precipitation zones on the Loess Plateau JI Jingyi, ZHAO Yunge, WANG Shanshan, et al (1444)
- Investigation on the light energy absorption characteristics of chlorophyll molecules for soybean KANG Huajing, LI Jinsheng, WANG Fubiao, et al (1454)
- Effects of regional climate on cuticle lightness of urban ant communities from the eastern margin of the Qinghai-Tibet Plateau SU Qiuhai, LUO Xinyu, YIN Ruyi, et al (1464)
- Distribution of ground-active arthropod community in a desert steppe ecosystem at eastern foot of Helan Mountain GUO Zhixia, LIU Rentao, ZHAO Wenzhi (1472)
- Study on behavioral strategies of varied tits to deal with different types of nest predators during brooding period YANG Jinyu, FENG Dequan, WAN Dongmei, et al (1486)
- Analysis of spatial distribution characteristics and influencing factors of *Lasiopodomys brandtii* based on unmanned aerial vehicle (UAV) low altitude remote sensing images DU Bobo, JI Chao, WANG Dawei, et al (1494)

《生态学报》

Acta Ecologica Sinica

入选“中国科技期刊卓越行动计划”;入围“中国科协生态学领域高质量科技期刊 T1 区”

《生态学报》是由中国科学技术协会主管,中国生态学学会、中国科学院生态环境研究中心主办的生态学高级专业学术期刊,半月刊,主编傅伯杰院士。本刊坚持百花齐放、百家争鸣,产生于科学性、立足于学术性、着眼于实践性、服务于社会性的办刊宗旨,依靠和团结广大生态学科研工作者,为生态学基础理论和应用研究搭建国内一流的学术交流平台,促进生态学研究深入发展,为我国培养和造就生态学科研人才,为国民经济建设和发展提供知识创新服务。

《生态学报》主要报道生态学重要基础理论和应用研究的原始创新性科研成果。所刊文章类型有:研究综述;研究论文;学术信息与动态;生态学新理论、新方法、新技术介绍;新书评介及开放实验室介绍等。《生态学报》为国内一流领军期刊;国际生态学 Q1 类期刊;期刊总被引频次居中国自然科学期刊第 1 名,影响因子居生态学学科中文期刊第 1 名;连年获得“中国百种杰出学术期刊”、“中国最具国际影响力学术期刊”和“期刊数字影响力 100 强”等荣誉称号;获得中国科协 TOP50 科技期刊和中国科协中文精品科技期刊建设项目资助;中国科协生态学领域高质量科技期刊 T1 区期刊;中国科技期刊卓越行动计划入选期刊。

办公室电话: 010-62941099

E-mail: shengtaixuebao@rcees.ac.cn

投稿网址: www.ecologica.cn

若未订阅,但需本刊某期纸质本,请联系科学出版社购买,电话:010-64017032,010-64017539

执行副主编 全元 责任编辑 刘昕 谢武双 于恩逸 朱晶莹 编辑 宗静 彭小琼 刘佩琼 孔红梅

生态学报
(SHENGTAI XUEBAO)
(半月刊 1981 年 3 月创刊)
第 45 卷 第 3 期 (2025 年 2 月)

ACTA ECOLOGICA SINICA
(Semimonthly, Started in 1981)
Vol.45 No.3 (February, 2025)

编辑 《生态学报》编辑部
地址:北京海淀区双清路 18 号
邮政编码:100085
电话:010-62941099
www.ecologica.cn
shengtaixuebao@rcees.ac.cn

Edited by Editorial board of
ACTA ECOLOGICA SINICA
Add:18, Shuangqing Street, Haidian, Beijing 100085, China
Tel:010-62941099
www.ecologica.cn
shengtaixuebao@rcees.ac.cn

主编 傅伯杰
主管 中国科学技术协会
主办 中国生态学学会
中国科学院生态环境研究中心
地址:北京海淀区双清路 18 号
邮政编码:100085

Editor-in-chief FU Bojie
Supervised by China Association for Science and Technology
Sponsored by Ecological Society of China
Research Center for Eco-environmental Sciences, CAS
Add:18, Shuangqing Street, Haidian, Beijing 100085, China

出版 科学出版社

Published by Science Press
Add:16 Donghuangchenggen North Street,
Beijing 100717, China

印刷 北京宝昌彩色印刷有限公司

Printed by Beijing Baochang Color Printing Co., Ltd.,
Beijing 100094, China

国内发行 全国各地邮局

Subscribe by Science Press
Tel:010-64017032, 010-64017539
E-mail: journal@cspg.net

邮发代号 82-7

国外发行 中国国际图书贸易总公司

发行代号 M670

订阅 科学出版社期刊发行部
010-64017032, 010-64017539
或扫描封底二维码

Domestic issue All Local Post Offices in China 82-7
Foreign issue China International Book Trading M670
Corporation
Add: P.O.Box 399 Beijing 100044, China

广告经营 京海工商广字第 8013 号



ISSN 1000-0933

CN 11-2031/Q

定价 120.00 元