



生态学报

ACTA ECOLOGICA SINICA

第44卷 第1期 Vol.44 No.1 2024 ISSN 1000-0933 CN 11-2031/Q



中国生态学学会
中国科学院生态环境研究中心

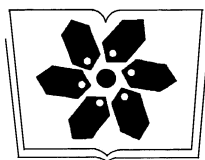
主办



科学出版社
Science Press

出版

方知库
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 44 卷 第 1 期 2024 年 1 月 (半月刊)

目 次

专论与综述

- 台风干扰海岸林受损及灾后恢复的影响因素研究进展..... 杜建会,陈嘉健,李升发 (1)
- 积雪变化对陆地生态系统植被特征和土壤碳氮过程的影响 党 宁,马 望,代泽成,等 (18)
- 生态流量方法应用现状研究 李 强,王俏俏,陈红丽,等 (36)
- 生态文明背景下三生空间研究:内涵、进展与对策..... 张令达,侯全华,段亚琼 (47)
- 基于植物功能群的生态系统服务形成与维持机制研究..... 范玉龙,胡 楠,丁圣彦 (60)

研究论文

- 1973—2020 年黄河三角洲滨海盐沼湿地景观格局演化模式和驱动因素 尹小岚,谭程月,柯樱海,等 (67)
- 基于地貌差异的景观格局转型研究——以三峡库区奉节县为例 汪 荣,李阳兵,郑骆珊,等 (81)
- 辽宁太子河流域生态系统服务权衡/协同关系时空变化与情景预测 王 耕,冯 妍 (96)
- 不同气候区生态系统服务权衡空间异质性及其驱动因素——以川滇-黄土高原生态屏障带为例 殷允可,李昊瑞,张 铭,等 (107)
- 长江中游城市群建成区绿色基础设施对 $PM_{2.5}$ 的消减效应..... 方云皓,赵丽元,窦碧莹,等 (117)
- 基于 Markov-PLUS 模型的长株潭城市群建设用地扩张模拟及碳排放响应分析 田一豆,赵先超 (129)
- 基于主体功能区的山西省碳排放时空特征及减排评价 李 虹,张 红,贺桂珍,等 (143)
- 高寒生态系统脆弱性及其对气候变化和人类活动的响应 张庭康,王军邦,叶 辉,等 (154)
- 基于自组织特征映射模型(SOFM)网络的中国自然资源生态安全区划 ... 邹 易,蒙吉军,吴英迪,等 (171)
- 基于农户感知的黄河下游人-水关系结构分析 于佳睿,孙璐娜,刘慕义,等 (183)
- 牧户的草原生态补偿政策满意度与支持度——基于 CSI 框架和 SEM 的检验 蒋 振,高雅罕,靳乐山 (196)
- 气候变化情景下大花杓兰在中国的适生区预测 吴 齐,董树斌,杨 蕾,等 (209)
- 基于 MaxEnt 模型预测未来气候变化情境下红树秋茄(*Kandelia obovata*)在中国潜在适生区的变化 应邦肯,田 阔,郭浩宇,等 (224)
- 澜沧江源区高山柏径向生长对气候变化的响应 赵国清,信忠保,柳金昊,等 (235)
- 高阶作用对植物-传粉者-植食动物集合群落续存的影响 叶 曦,方笛熙,张 锋 (246)
- 典型浅街峡谷布局及其植物配置模式春季花粉飞散特征模拟研究 陈 颖,于 淼,马 嘉,等 (256)

耦合叶肉导度的陆面过程模型最大叶肉导度参数的敏感性分析..... 陈美玲,袁国富,陈报章 (271)

小黄花茶群落优势木本植物生态位及种间联结性 李锦婷,穆 君,申开平,等 (283)

性别和发育阶段对绒毛白蜡光合特征及叶功能性状的影响 张碧嘉,于 森,徐 晴,等 (295)

升温、光周期和氮添加变化对兴安落叶松幼苗叶黄期的影响..... 张宇钦,周广胜,吕晓敏,等 (306)

不同纬度植物群落系统发育与功能性状结构研究 苗乐乐,刘旻霞,肖音迪,等 (317)

荒漠草原不同植物群落蒸散组分特征及其环境因子影响分析 陈 林,杨新国,王 磊,等 (330)

基于刺槐年轮重建黄土丘陵区小流域年径流输沙研究 刘春月,信忠保,李宗善,等 (343)

中国温带草地物候对气候变化的响应及其对总初级生产力的贡献 袁沫汐,文佐时,何利杰,等 (354)

基于遥感数据的植被碳水利用效率时空变化和归因分析 林子琦,温仲明,刘洋洋,等 (377)

青藏高原灌丛土壤碳氮含量及其相关功能基因分布特征 李传虹,张 林,刘四义,等 (392)

青藏高原高寒草地土壤酶活性海拔地带性特征 霍皇煜,米 琦,周天财,等 (405)

不同重金属污染水平下生物结皮及下层土壤细菌群落的差异性分析 樊 瑾,王融融,丛士翔,等 (416)

腾格里沙漠东南缘人工固沙植被演替地面节肢动物群落多样性分布特征.....

..... 杨 敏,刘任涛,曾飞越,等 (428)

雷州半岛红树林鱼类群落结构及其与人类活动强度的关系 郑燕萍,刘 琦,黄 欣,等 (440)

期刊基本参数:CN 11-2031/Q * 1981 * m * 16 * 454 * zh * P * ¥ 120.00 * 1510 * 35 * 2024-01



封面彩图提供: 陈保冬 中国科学院生态环境研究中心 E-mail: bdchen@rcees.ac.cn

ACTA ECOLOGICA SINICA Vol.44, No.1 January, 2024 (Semimonthly)

CONTENTS

Review and Monograph

Factors affecting the damage and recovery of coastal forest after typhoon disturbance: A review	DU Jianhui, CHEN Jiajian, LI Shengfa (1)
Impact of changes in snow cover characteristics on plant community and soil carbon and nitrogen processes	DANG Ning, MA Wang, DAI Zecheng, et al (18)
Progress and perspectives on ecological flow assessment methods in China	LI Qiang, WANG Qiaoqiao, CHEN Hongli, et al (36)
A literature review on Production-Living-Ecological Spaces in the context of ecological civilization: connotation, problems and countermeasures	ZHANG Lingda, HOU Quanhua, DUAN Yaqiong (47)
Formation and maintenance mechanism of ecosystem services based on plant functional groups	FAN Yulong, HU Nan, DING Shengyan (60)

Research Paper

Evolution and driving factors of salt marsh wetland landscape pattern in the Yellow River Delta in 1973—2020	YIN Xiaolan, TAN Chengyue, KE Yinghai, et al (67)
Landscape pattern transformation based on differences in topography: Taking Fengjie County in the Three Gorges Reservoir Area as an example	WANG Rong, LI Yangbing, ZHENG Luoshan, et al (81)
Spatio-temporal variation and scenario prediction of ecosystem service tradeoffs/synergies in the Taizi River Basin, Liaoning Province	WANG Geng, FENG Yan (96)
Spatial heterogeneity of ecosystem service trade-offs in different climatic regions and its driving factors: A case study of the Sichuan-Yunnan-Loess Plateau ecological barrier zone	YIN Yunke, LI Haorui, ZHANG Ming, et al (107)
Reduction effect of green infrastructure on PM _{2.5} in the built-up areas of urban agglomerations in the Yangtze River's middle reaches	FANG Yunhao, ZHAO Liyuan, DOU Biying, et al (117)
Simulation of construction land expansion and carbon emission response analysis of Changsha-Zhuzhou-Xiangtan Urban Agglomeration based on Markov-PLUS model	TIAN Yidou, ZHAO Xianchao (129)
Spatio-temporal characteristics and reduction evaluation of carbon emission from the perspective of Major Function Oriented Zones, Shanxi Province	LI Hong, ZHANG Hong, HE Guizhen, et al (143)
Vulnerability of alpine ecosystems and its response to climate change and human activities	ZHANG Tingkang, WANG Junbang, YE Hui, et al (154)
Ecological security regionalization of natural resources in China based on Self-Organizing Feature Map neural network	ZOU Yi, MENG Jijun, WU Yingdi, et al (171)
Analysis of human-water relationship structure in the lower reaches of Yellow River Basin based on farmers' perception	YU Jiarui, SUN Luna, LIU Muiyi, et al (183)
Herdsmen's satisfaction and support to grassland eco-compensation policy: A SEM test based on CSI logic model	JIANG Zhen, GAO Yahan, JIN Leshan (196)
Prediction of potential distribution of <i>Cypripedium macranthos</i> under climate change scenarios in China	WU Qi, DONG Shubin, YANG Lei, et al (209)
Predicting potential suitable habitats of <i>Kandelia obovata</i> in China under future climatic scenarios based on MaxEnt model	YING Bangken, TIAN Kuo, GUO Haoyu, et al (224)
Response of radial growth of <i>Sabina squamata</i> to climatic change in the Source Region of Lancang River	ZHAO Guoqing, XIN Zhongbao, LIU Jinhao, et al (235)

- Effects of Higher-Order Interactions on the persistence of plant-pollinator-herbivore metacommunities YE Xi, FANG Dixi, ZHANG Feng (246)
- Simulation study on the characteristics of spring pollen scattering in typical shallow street canyon layout and plant configuration mode CHEN Ying, YU Miao, MA Jia, et al (256)
- Sensitivity analysis of maximum mesophyll conductance parameter in land surface model coupled with mesophyll conductance CHEN Meiling, YUAN Guofu, CHEN Baozhang (271)
- Niche and interspecific association of dominant woody plants in *Camellia luteoflora* community LI Jinting, MU Jun, SHEN Kaiping, et al (283)
- Effects of gender and development stages on photosynthetic characteristics and leaf functional traits of *Fraxinus velutina* Torr ZHANG Bijia, YU Miao, XU Qing, et al (295)
- Impacts of temperature rising, photoperiod and nitrogen addition changes on leaf yellow phenology of *Larix gmelini* seedlings ZHANG Yuqin, ZHOU Guangsheng, LÜ Xiaomin, et al (306)
- Studies on phylogeny and functional traits structure of plant communities at different latitudes MIAO Lele, LIU Minxia, XIAO Yindi, et al (317)
- Characteristics of evapotranspiration components of different plant communities in desert steppe and its relationship with environmental factors CHEN Lin, YANG Xinguo, WANG Lei, et al (330)
- Reconstruction of annual runoff and sediment transport using tree-ring of black locust (*Robinia pseudoacacia* Linn.) in the Loess Hilly Region, China LIU Chunyue, XIN Zhongbao, LI Zongshan, et al (343)
- Response of temperate grassland phenology to climate change and its contribution to gross primary productivity in China YUAN Moxi, WEN Zuoshi, HE Lijie, et al (354)
- Spatiotemporal variation and attribution of carbon and water use efficiency in the Yellow River Basin based on remote sensing data LIN Ziqi, WEN Zhongming, LIU Yangyang, et al (377)
- Distribution characteristics of carbon and nitrogen contents and related functional genes in shrub soils of the Tibetan Plateau LI Chuanhong, ZHANG Lin, LIU Siyi, et al (392)
- Altitude pattern of soil enzyme activities in alpine grasslands across the Qinghai-Tibet Plateau HUO Huangyu, MI Qi, ZHOU Tiancai, et al (405)
- Difference of bacterial community in biocrust and underlying soil under different heavy metal pollution levels FAN Jin, WANG Rongrong, CONG Shixiang, et al (416)
- Distribution of ground-active arthropod community diversity during the succession of artificial sand-fixing vegetation in the southeastern Tengger Desert YANG Min, LIU Rentao, ZENG Feiyue, et al (428)
- Community structure of fish in mangrove forests of the Leizhou Peninsula and its relationship with human activity intensity ZHENG Yanping, LIU Qi, HUANG Xin, et al (440)

《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,但需购买本刊某期纸质本,请联系科学出版社,购买电话:010-64017032,010-64017539

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

生态学报
(SHENGTAI XUEBAO)
(半月刊 1981 年 3 月创刊)
第 44 卷 第 1 期 (2024 年 1 月)

ACTA ECOLOGICA SINICA
(Semimonthly, Started in 1981)
Vol.44 No.1 (January, 2024)

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

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

出版 科学出版社

印刷 北京宝昌彩色印刷有限公司

国内发行 全国各地邮局

发行代号 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

广告经营 京海工商广字第 8013 号

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

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

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

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

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

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



ISSN 1000-0933

CN 11-2031/Q

定价 120.00 元