

QK2033587



生态学报

ACTA ECOLOGICA SINICA

第40卷 第13期 Vol. 40 No. 13 2020

ISSN 1000-0933 CN 11-2031/Q

第十八届中国生态学大会专辑

中国生态学学会
中国科学院生态环境研究中心

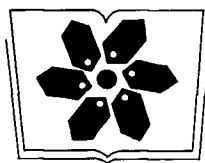
主办



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 40 卷 第 13 期 2020 年 7 月 (半月刊)

目 次

第十八届中国生态学大会专辑

- “一带一路”沿线地区 NO₂ 浓度时空变化特征及其驱动因素 方 恺,王婷婷,何坚坚,等 (4241)
- 中蒙俄经济走廊荒漠化时空格局变化及其驱动因子 范泽孟,李赛博 (4252)
- 海洋生态系统调节服务价值评估方法及应用——以温州市为例 郝林华,何 帅,陈 尚,等 (4264)
- 乌裕尔河-双阳河流域湿地景观格局演变及其驱动机制 吴金华,房世峰,刘宝军,等 (4279)
- 基于地形梯度的甘肃白龙江流域典型生态系统服务分布特征 徐彩仙,巩 杰,李 焱,等 (4291)
- 基于指标自动筛选的新疆开孔河流域生态健康评价 汪小钦,林梦婧,丁 哲,等 (4302)
- 生态系统服务功能与景观格局耦合协调度研究——以武陵山区退耕还林工程为例
..... 李慧杰,牛 香,王 兵,等 (4316)
- 南北疆区域经济差异化三维生态足迹自然资本利用的时空演变 金梦婷,徐丽萍,李鹏辉 (4327)
- 基于 ENVI-met 的城市道路绿地植物配置对 PM_{2.5} 的影响研究 顾康康,钱 兆,方云皓,等 (4340)
- “三江并流”区游憩文化生态系统服务评价研究 郭 洋,杨飞龄,王军军,等 (4351)
- 基于碳足迹的传统农业系统环境影响评价——以青田稻鱼共生系统为例
..... 崔文超,焦雯璐,闵庆文,等 (4362)
- 利用大气二氧化碳和羧基硫浓度评估陆地生态系统模型碳通量模拟的不确定性
..... 何 维,江 飞,居为民 (4371)
- 盐度对沙蜚有性繁殖阶段早期发育的影响 柴 雨,董 婧,段 妍,等 (4383)
- 中街山列岛海域鱼卵、仔稚鱼群落结构特征及其与环境因子的关系 樊紫薇,蒋日进,李 哲,等 (4392)
- 温度对海月水母螵状体生长及繁殖的影响 段 妍,孙 明,董 婧,等 (4404)
- 酸性稻田添加生物炭对水稻生长发育及产量的影响——基于 5 年大田试验
..... 荣飞龙,蔡正午,覃莎莎,等 (4413)
- 滇中退化山地不同植被恢复下土壤碳氮磷储量与生态化学计量特征 何高迅,王 越,彭淑娴,等 (4425)
- 亚高山森林溪流镉储量与分配的动态变化特征 蒋雨芮,周 蛟,李 晗,等 (4436)
- 珍稀濒危树种峨眉含笑种群结构与动态特征 秦爱丽,马凡强,许格希,等 (4445)
- 利用皆伐法估算黔中喀斯特森林地上生物量 刘立斌,周运超,程安云,等 (4455)
- 不同植物根际土壤碳氮水解酶活性热点区的空间分布特征 刘 霜,张心昱 (4462)
- 毛乌素沙地三种灌木群落的水分利用过程 朱雅娟,崔清国,杜 娟,等 (4470)
- 中国北部不同地点樟子松人工林径向生长对气候响应的差异 雷 帅,张劲松,孟 平,等 (4479)
- 三峡库区消落带 4 种典型草本植物的生态化学计量特征 孔维苇,王晓锋,卢虹宇,等 (4493)
- 三峡水库消落区不同生活史类型植物群落的空间分布格局 苏琴琴,俞幸池,覃红玲,等 (4507)
- 广东南岭天然常绿阔叶林林下光环境对林下幼树功能性状的影响 郑 芬,李兆佳,邱治军,等 (4516)

上海金泽水库典型挺水植物碳、氮、磷化学计量特征的季节变化..... 唐 玥,童春富,刘毛亚,等 (4528)

减雨对南亚热带马尾松人工林凋落物分解的影响..... 舒韦维,陈 琳,刘世荣,等 (4538)

放牧强度对短花针茅荒漠草原甲虫群落分布格局的影响..... 常 虹,孙海莲,刘亚红,等 (4546)

基于地面 LiDAR 数据的塔里木河下游胡杨林结构参数反演 艾萨迪拉·玉苏甫,玉米提·哈力克,阿不都拉·阿不力孜,等 (4555)

多年生黑麦草对干旱胁迫下喀斯特异质生境的生长响应策略..... 王佳敏,宋海燕,陈金艺,等 (4566)

马尾松林向香樟林改造林下植物功能多样性研究..... 黄 超,魏 虹,吴科君,等 (4573)

半干旱矿区排土场苜蓿恢复过程中土壤颗粒分形的演变特征..... 王东丽,刘 阳,郭莹莹,等 (4585)

亚热带不同树种土壤水源涵养功能..... 杨 静,张耀艺,谭思懿,等 (4594)

新疆博格达山地面生地衣群落数量分类及物种多样性..... 田雅楠,帕丽旦·艾海提,买吾拉江·衣沙克,等 (4605)

增温和外源碳输入对泥炭地土壤碳氮循环关键微生物功能基因丰度的影响..... 高思齐,宋艳宇宋长春,等 (4617)

灰化苔草对不同水位环境的生理适应性..... 尧晓晨,曹 昀,郑国砥,等 (4628)

石林风景区不同石漠化人工修复方式对木本植物群落组成及种群生态位的影响..... 李 坤,邢小艺,李逸伦,等 (4641)

铜尾矿白羊草各生长阶段根际土壤丛枝菌根真菌群落特征 贾 彤,姚玉珊,郭婷艳 (4651)

佛山城市典型森林群落土壤重金属分布、流通及枯落物富集特征 朱立安,曾清苹,柳 勇,等 (4659)

酸雨对毛竹入侵阔叶林缓冲区根系形态及分布格局的影响..... 王 楠,潘小承,白尚斌,等 (4670)

人类扰动对重金属元素的生物地球化学过程的影响与修复研究进展..... 李 婷,吴明辉,王 越,等 (4679)

多功能农业景观:内涵、进展与研究范式..... 汤 茜,丁圣彦 (4689)

期刊基本参数:CN 11-2031/Q * 1981 * m * 16 * 458 * zh * P * ¥90.00 * 1510 * 43 * 2020-07

封面彩图提供:丁大鹏 E-mail: 28835652@ qq.com

ACTA ECOLOGICA SINICA Vol.40, No.13 July, 2020 (Semimonthly)
CONTENTS

Spatiotemporal variation and driving factors of NO₂ concentrations in the Belt and Road region FANG Kai, WANG Tingting, HE Jianjian, et al (4241)

Spatio-temporal pattern change of desertification and its driving factors analysis in China-Mongolia-Russia economic corridor FAN Zemeng, LI Saibo (4252)

Evaluation method and application on regulating service value in marine ecosystem: Wenzhou city's practice HAO Linhua, HE Shuai, CHEN Shang, et al (4264)

Landscape pattern evolution of wetland and its driving mechanism in Wuyue-Shuangyang River Basin WU Jinhua, FANG Shifeng, LIU Baojun, et al (4279)

Spatial distribution characteristics of typical ecosystem services based on terrain gradients of Bailongjiang Watershed in Gansu XU Caixian, GONG Jie, LI Yan, et al (4291)

Ecological health assessment of Kaikong River Basin based on automatic screening of indicators in Xinjiang WANG Xiaoqin, LIN Mengjing, DING Zhe, et al (4302)

Coupled coordination of ecosystem services and landscape patterns: Take the Grain for Green Project in the Wuling Mountain Area as an example LI Huijie, NIU Xiang, WANG Bing, et al (4316)

Spatial and temporal evolution of natural capital utilization in the three-dimensional ecological footprint under the regional economic differentiation in north and south Xinjiang JIN Mengting, XU Liping, LI Penghui (4327)

Influence of vegetation arrangement on PM_{2.5} in urban roadside based on ENVI-met GU Kangkang, QIAN Zhao, FANG Yunhao, et al (4340)

Assessment of the tourism and recreation cultural ecosystem services in Three Parallel Rivers Region GUO Yang, YANG Feiling, WANG Junjun, et al (4351)

Environmental impact assessment on traditional agricultural systems based on carbon footprint: a case study of Qingtian rice-fish culture system CUI Wenchao, JIAO Wenjun, MIN Qingwen, et al (4362)

Using atmospheric concentrations of carbon dioxide and carbonyl sulfide to assess the uncertainty of carbon fluxes simulated by terrestrial biosphere models HE Wei, JIANG Fei, JU Weimin (4371)

Effects of salinity on early development in sexual reproduction stage of the scyphozoan *Nemopilema nomurai* Scyphozoa Rhizostomeae CHAI Yu, DONG Jing, DUAN Yan, et al (4383)

Community structure of ichthyoplankton and its relationship with environmental factors in Zhongjieshan islands, China FAN Ziwei, JIANG Rijin, LI Zhe, et al (4392)

Effects of temperature on the growth and asexual reproduction of moon jellyfish (*Aurelia coerulea*) polyps DUAN Yan, SUN Ming, DONG Jing, et al (4404)

Effects of biochar on growth and yield of rice in an acidic paddy field: findings from a five-year field trial RONG Feilong, CAI Zhengwu, QIN Shasha, et al (4413)

Soil carbon, nitrogen and phosphorus stocks and ecological stoichiometry characteristics of different vegetation restorations in degraded mountainous area of central Yunnan, China HE Gaoxun, WANG Yue, PENG Shuxian, et al (4425)

Dynamic characteristics of cadmium storage and distribution in the subalpine forest streams JIANG Yurui, ZHOU Jiao, LI Han, et al (4436)

Population structure and dynamic characteristics of a rare and endangered tree species *Michelia wilsonii* Finet et Gagn QIN Aili, MA Fanqiang, XU Gexi, et al (4445)

Aboveground biomass estimate of a karst forest in central Guizhou Province, southwestern China based on direct harvest method LIU Libin, ZHOU Yunchao, CHENG Anyun, et al (4455)

Spatial distribution of carbon and nitrogen acquiring hydrolase activity hotspots in rhizosphere soils of different plants LIU Shuang, ZHANG Xinyu (4462)

Water use of three shrub communities in Mu Us Sandy Land ZHU Yajuan, CUI Qingguo, DU Juan, et al (4470)

Differences in tree-ring growth response of *Pinus sylvestris* var. *mongolica* to climatic variation at different locations in northern China LEI Shuai, ZHANG Jinsong, MENG Ping, et al (4479)

Ecological stoichiometry of four typical herbaceous species in the Littoral Zone of Three Gorges Reservoir KONG Weiwei, WANG Xiaofeng, LU Hongyu, et al (4493)

Spatial distribution of plant communities composed of different life history species in the water-level-fluctuating-zone of Three Gorges Reservoir SU Qinqin, YU Xingchi, QIN Hongling, et al (4507)

Effects of understory light on functional traits of evergreen broad-leaved forest saplings in Nanling Mountains, Guangdong Province ... ZHENG Fen, LI Zhaojia, QIU Zhijun, et al (4516)

Seasonal variations of carbon, nitrogen, phosphorus stoichiometry of four emergent hydrophytes in Jinze Reservoir, Shanghai TANG Yue, TONG Chunfu, LIU Maoya, et al (4528)

Effects of throughfall reduction on litter decomposition of *Pinus massoniana* plantation in subtropical China SHU Weiwei, CHEN Lin, LIU Shirong, et al (4538)

Effects of different grazing intensities on the community structure of beetle community in *Stipa breviflora* desert steppe CHANG Hong, SUN Hailian, LIU Yahong, et al (4546)

Terrestrial laser scanning for retrieving the structural parameters of *Populus euphratica* riparian forests in the lower reaches of the Tarim River, China Asadilla YUSUP, Ümüt HALIK, Abdulla ABLIZ, et al (4555)

Response strategies of *Lolium perenne* L. to karst heterogeneous habitats under drought stress WANG Jiamin, SONG Haiyan, CHEN Jinyi, et al (4566)

The functional diversity of understory plants during the transformation from *Pinus massoniana* to *Cinnamomum camphora* forest HUANG Chao, WEI Hong, WU Kejun, et al (4573)

The fractal characteristics of soil particles during the restoration of *Medicago Sativa* in a semi-arid mining dump WANG Dongli, LIU Yang, GUO Yingying, et al (4585)

Soil water conservation functions of different plantations in subtropical forest YANG Jing, ZHANG Yaoyi, TAN Siyi, et al (4594)

Numerical classification and species diversity of terricolous lichen communities in Bogda Mountain of Xinjiang, China TIAN Yanan, AHAT Parida, ISSAK Mawlanjan, et al (4605)

Effects of warming and exogenous carbon input on the abundance of key microbial functional genes of carbon-nitrogen cycle in peatland soil GAO Siqi, SONG Yanyu, SONG Changchun, et al (4617)

The physiological adaptability of *Carex cinerascens* to different water level environments YAO Xiaochen, CAO Yun, ZHENG Guodi, et al (4628)

Effect of different artificial restoration methods of Karst rocky desertification on community composition and niche characteristics of woody populations in Shilin scenic area LI Kun, XING Xiaoyi, LI Yilun, et al (4641)

Characteristics of arbuscular mycorrhizal fungi communities in rhizosphere soil at different growth stages of *Bothriochloa ischaemum* in copper tailings JIA Tong, YAO Yushan, GUO Tingyan (4651)

Heavy metals distribution and circulation in soils and their enrichment characteristics by litter in urban typical forest communities in Foshan, China ZHU Li'an, ZENG Qingping, LIU Yong, et al (4659)

Effects of acid rain on root morphology and distribution pattern in the buffer zone of broad-leaved forest invaded by Moso bamboo ... WANG Nan, PAN Xiaocheng, BAI Shangbin, et al (4670)

Advances in research on the effects of human disturbance on biogeochemical processes of heavy metals and remediation LI Ting, WU Minghui, WANG Yue, et al (4679)

Multifunctional agricultural landscape: concept, progress and study paradigm TANG Qian, DING Shengyan (4689)

《生态学报》2020 年征订启事

《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共同主办的生态学高级专业学术期刊,创刊于 1981 年,报道生态学领域前沿理论和原始创新性研究成果。坚持“百花齐放,百家争鸣”的方针,依靠和团结广大生态学科工作者,探索生态学奥秘,为生态学基础理论研究搭建交流平台,促进生态学研究发展,为我国培养和造就生态学科人才和知识创新服务、为国民经济建设和发展服务。

《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。主要刊载文章类型有: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。欢迎广大科技工作者、科研单位、高等院校、图书馆等订阅。

《生态学报》半月刊,大 16 开本,280 页,国内定价 90 元/册,全年定价 2160 元。

办公电话: 010-62941099, 010-62843362 E-mail: shengtaixuebao@rcees.ac.cn

投稿网址: www.ecologica.cn

执行副主编 孔红梅 责任编辑 刘 昕 全 元 谢武双 朱晶莹 编辑 宗 静 彭小琼

生 态 学 报
(SHENGTAI XUEBAO)
(半月刊 1981 年 3 月创刊)
第 40 卷 第 13 期 (2020 年 7 月)

ACTA ECOLOGICA SINICA
(Semimonthly, Started in 1981)
Vol. 40 No. 13 (July, 2020)

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	Editor-in-chief	FU Bojie
主 管	中国科学技术协会	Supervised by	China Association for Science and Technology
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	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
发行代号	82-7	Domestic issue	All Local Post Offices in China 82-7
国外发行	中国国际图书贸易总公司	Foreign issue	China International Book Trading Corporation Add: P.O.Box 399 Beijing 100044, China
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		



ISSN 1000-0933 CN 11-2031/Q 定价 90.00 元