

农业工程学报

TRANSACTIONS OF THE CHINESE SOCIETY OF AGRICULTURAL ENGINEERING

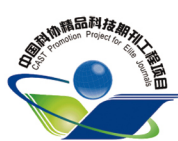
二〇二〇年十一月

第三十六卷

第二十一期

中国农业工程学会

《中文核心期刊要目总览》收录
Ei Compendex(核心版)收录
百种中国杰出学术期刊
RCCSE中国权威学术期刊



ISSN 1002-6819
CN 11-2047/S
CODEN NGOXEO
www.tcsae.org

农业工程学报

NONGYE
GONGCHENG
XUEBAO

TRANSACTIONS OF THE CHINESE SOCIETY
OF AGRICULTURAL ENGINEERING

2020年 21
第36卷 VOL. 36



中国科学技术协会 主管 | 中国农业工程学会 主办

万方数据

农业工程学报

2020年11月第21期 总第397期(第36卷)

目次

· 农业装备工程与机械化 ·

机械式小麦射播排种器参数优化与试验

..... 王英博, 李洪文, 何进, 王庆杰, 卢彩云, 刘鹏, 杨庆璐 (1)

玉米原茬地秸秆还田比例调节装置设计与试验

..... 史乃煜, 陈海涛, 魏志鹏, 侯守印, 邹震, 王星 (11)

立锥式小区花生脱壳机气吸清选装置研制..... 陆荣, 刘志侠, 高连兴, 杨德旭 (23)

SSQ系列射流施肥器水力性能试验研究..... 汪小珊, 严海军, 周凌九, 徐云成 (31)

夹茎式番茄钵苗取苗机构设计与试验..... 李华, 马晓晓, 曹卫彬, 李树峰, 周文静 (39)

拖拉机变速箱箱体快速设计方法与软件开发

..... 张延安, 辛喆, 杜岳峰, 邵明奎, 孙恩鑫, 张发旺 (49)

麻山药种植田沙壤土流动性离散元模型颗粒放尺效应

..... 郝建军, 龙思放, 李建昌, 马志凯, 赵晓顺, 赵建国, 李浩 (56)

基于复合MPC算法的风电机组降载控制..... 田德, 陈忠雷, 邓英 (65)

· 农业水土工程 ·

秸秆覆盖方式和施氮量对河套灌区夏玉米氮利用及产量影响

..... 张万锋, 杨树青, 刘鹏, 娄帅, 孙多强 (71)

肥料减量深施对土壤 N_2O 排放和冬油菜产量的影响

..... 陈慧, 高丽萍, 廖庆喜, 张青松, 肖文立, 魏国梁, 廖宜涛 (80)

咸淡交替灌溉下生物炭对滨海盐渍土及玉米产量的影响

..... 黄明逸, 张展羽, 翟亚明, 王策, 齐伟, 朱成立 (88)

高分子材料对土壤-作物氮磷分布及春小麦产量的影响

..... 田小明, 王开勇, 王激清, 樊华, 鄂玉联, 张开祥, 马宏秀 (97)

双季稻减排增收的水氮优化管理模式筛选

..... 李如楠, 李玉娥, 王斌, 万运帆, 李健陵, 马婷, 翁士梅, 秦晓波, 高清竹 (105)

考虑基土不均匀冻胀的梯形渠道混凝土衬砌弹性地基梁力学模型

..... 李宗利, 姚希望, 张锐, 邵化建, 王正中 (114)

灌淤冻土复合衬砌渠道保温防冻胀效果分析..... 张栋, 郭璇 (122)

坡面径流小区集流桶含沙量测量方法对比

..... 陈晓安, 曹智, 喻荣岗, 张龙, 陈浩, 蔡袁海, 冯阳 (130)

考虑流固耦合的厚壁输水管水锤和振动特性分析..... 郭强, 周建旭, 黄亚, 张建 (137)

软基水闸底板脱空动力学反演模型构建与试验验证..... 李火坤, 余杰, 王刚, 魏博文, 黄伟, 黄锦林 (145)

中国北方主产地苹果始花期模拟及晚霜冻风险评估

..... 邱美娟, 刘布春, 刘园, 王珂依, 庞静漪, 张晓男, 贺金娜 (154)

基于SPEI_Kc的华北平原小麦玉米周年干旱特征分析

..... 马雪晴, 胡琦, 王靖, 潘学标, 张君, 王晓晨, 胡莉婷, 和骅芸, 李蓉, 邢梦媛 (164)

• 农业信息与电气技术 •

利用 STARFM 模型提高复杂地表下复种指数遥感提取精度
..... 张 伟, 李 玮, 陶冠宏, 李爱农, 覃志豪, 雷光斌, 陈艺曦 (175)

基于深度卷积神经网络的田间麦穗密度估计及计数
..... 鲍文霞, 张 鑫, 胡根生, 黄林生, 梁 栋, 林 泽 (186)

花龄期棉花虫害的电子鼻检测 周 博, 代雨婷, 李 超, 王 俊 (194)

改进 Faster R-CNN 的群养猪只圈内位置识别与应用
..... 王 浩, 曾雅琼, 裴宏亮, 龙定彪, 徐顺来, 杨飞云, 刘作华, 王德麾 (201)

基于颈环采集节点的母羊产前行为识别方法 应烨伟, 曾松伟, 赵阿勇, 颜菲菲 (210)

基于立体视觉的动态鱼体尺寸测量 李艳君, 黄康为, 项 基 (220)

• 农业生物环境与能源工程 •

中国玉米秸秆草谷比及其资源时空分布特征
..... 霍丽丽, 赵立欣, 姚宗路, 贾吉秀, 赵亚男, 傅国浩, 丛宏斌 (227)

连栋玻璃温室采暖热负荷计算方法 富建鲁, 周长吉, 王 柳 (235)

日光温室黄瓜和芹菜不同位置消光系数模拟及验证 程 陈, 黎贞发, 董朝阳, 宫志宏, 冯利平 (243)

基于 ¹⁵N 示踪的“稻/草-食用菌-菜”循环系统氮肥利用率评价
..... 钟珍梅, 黄勤楼, 陈钟铤, 黄秀声, 冯德庆 (253)

规模化奶牛场粪污全量贮存及肥料化还田工艺设计 徐鹏翔, 沈玉君, 丁京涛, 孟海波, 张明月 (260)

木薯渣基质化发酵微生物分离及复合菌配制 王 战, 冷雨茜, 郭世荣, 孙 锦, 夏鹏飞, 束 胜 (266)

• 土地保障与生态安全 •

基于限制因子改良与耕地质量潜力耦合的耕地整治分区 赵海乐, 徐 艳, 张国梁, 周 翼, 常玉昞 (272)

基于改进的 GPU 并行 NSGA-III 的土地利用优化配置 王海军, 曾浩然, 张文婷, 张 彬, 周玲慧 (283)

• 农产品加工工程 •

地下粮仓塑料-混凝土防水体系抗水压试验 张 昊, 孟庆婷, 陶元庆, 王振清, 康少朋, 张祥祥 (292)

液态发酵饲料连续发酵工艺
..... 官小凤, 刘志云, 肖 融, 刘作华 (300)

木质素-苯酚-甲醛树脂胶黏剂的性能与合成机理
..... 吴志刚, 陈思成, 梁坚坤, 李利芬, 雷 洪, 董霖莹 (308)

• 研究速报 •

低温环境下热泵热风干燥藏药性能试验
..... 高 萌, 李 明, 王云峰, 余琼粉, 李 坤, 孙 伟, 罗 熙 (316)

Transactions
of the Chinese Society of Agricultural Engineering
Vol.36 No.21 Nov. 2020
CONTENTS

• Agricultural Equipment Engineering and Mechanization •

- Parameters optimization and experiment of mechanical wheat shooting seed-metering device
.....*Wang Yingbo, Li Hongwen, He Jin, Wang Qingjie, Lu Caiyun, Liu Peng, Yang Qinglu* (1)
- Design and experiment of stalk returning proportion adjusting device for corn original stubble
.....*Shi Naiyu, Chen Haitao, Wei Zhipeng, Hou Shouyin, Zou Zhen, Wang Xing* (11)
- Development of air suction cleaning device of vertical conical peanut sheller for plot planting
.....*Lu Rong, Liu Zhixia, Gao Lianxing, Yang Dexu* (23)
- Experimental research of hydraulic performance on jet fertilizer applicator of SSQ series
.....*Wang Xiaoshan, Yan Haijun, Zhou Lingjiu, Xu Yuncheng* (31)
- Design and experiment of seedling picking mechanism by stem clipping for tomato plug seedling
.....*Li Hua, Ma Xiaoxiao, Cao Weibin, Li Shufeng, Zhou Wenjing* (39)
- Rapid design method and software development for tractor gear box
.....*Zhang Yan'an, Xin Zhe, Du Yuefeng, Shao Mingxi, Sun Enxin, Zhang Fawang* (49)
- Effect of granular ruler in discrete element model of sandy loam fluidity in Ma yam planting field
.....*Hao Jianjun, Long Sifang, Li Jianchang, Ma Zhikai, Zhao Xiaoshun, Zhao Jianguo, Li Hao* (56)
- Wind turbine load shedding control based on multi MPC algorithm
.....*Tian De, Chen Zhonglei, Deng Ying* (65)

• Soil and Water Engineering •

- Effects of stover mulching combined with N application on N use efficiency and yield of summer maize in Hetao Irrigated District.....*Zhang Wanfeng, Yang Shuqing, Liu Peng, Lou Shuai, Sun Duoqiang* (71)
- Effects of reduced and deep fertilizer on soil N₂O emission and yield of winter rapeseed
.....*Chen Hui, Gao Liping, Liao Qingxi, Zhang Qingsong, Xiao Wenli, Wei Guoliang, Liao Yitao* (80)

Effects of biochar on coastal saline soil and maize yield under alternate irrigation with brackish and freshwater	<i>Huang Mingyi, Zhang Zhanyu, Zhai Yaming, Wang Ce, Qi Wei, Zhu Chengli</i> (88)
Effects of polymer materials on soil-crop nitrogen and phosphorus distribution and spring wheat yield	<i>Tian Xiaoming, Wang Kaiyong, Wang Jiqing, Fan Hua, E Yulian, Zhang Kaixiang, Ma Hongxiu</i> (97)
Pattern selection of water and nitrogen practices to reduce greenhouse gas emission and increase profit in a double rice system	<i>Li Runan, Li Yu'e, Wang Bin, Wan Yunfan, Li Jianling, Ma Ping, Weng Shimei, Qin Xiaobo, Gao Qingzhu</i> (105)
Frost heave mechanical model of concrete lining trapezoidal canal considering nonuniform frost heave of foundation soil based on elastic foundation beam theory.....	<i>Li Zongli, Yao Xiwang, Zhang Rui, Shao Huajian, Wang Zhengzhong</i> (114)
Effects of thermal insulation and anti-frost heaving in composite lining structures for a canal in colmatage frozen soil	<i>Zhang Dong, Guo Xuan</i> (122)
Comparison of measurement methods of sediment concentration in collecting tanks of slope runoff plots	<i>Chen Xiaolan, Cao Zhi, Yu Ronggang, Zhang Long, Chen Hao, Cai Yuanhai, Feng Yang</i> (130)
Water hammer and vibration analysis of a thick-wall pipe considering fluid-structure interaction	<i>Guo Qiang, Zhou Jianxu, Huang Ya, Zhang Jian</i> (137)
Model construction of dynamic inversion and experimental verification for the void of sluice floor on the soft foundation	<i>Li Huokun, Yu Jie, Wang Gang, Wei Bowen, Huang Wei, Huang Jinlin</i> (145)
Simulation of first flowering date for apple and risk assessment of late frost in main producing areas of northern China	<i>Qiu Meijuan, Liu Buchun, Liu Yuan, Wang Keyi, Pang Jingyi, Zhang Xiaonan, He Jinna</i> (154)
Spatiotemporal variation characteristics of drought trend at annual of wheat-maize in the North China Plain based on SPEI_K _C index	<i>Ma Xueqing, Hu Qi, Wang Jing, Pan Xuebiao, Zhang Jun, Wang Xiaochen, Hu Liting, He Huayun, Li Rong, Xing Mengyuan</i> (164)

• Agricultural Information and Electrical Technologies •

Improvement of extraction accuracy for cropping intensity in complex surface regions using STARFM	<i>Zhang Wei, Li Wei, Tao Guanhong, Li Ai'nong, Qin Zhihao, Lei Guangbin, Chen Yixi</i> (175)
Estimation and counting of wheat ears density in field based on deep convolutional neural network	<i>Bao Wenxia, Zhang Xin, Hu Gensheng, Huang Linsheng, Liang Dong, Lin Ze</i> (186)

Electronic nose for detection of cotton pests at the flowering stage
.....*Zhou Bo, Dai Yuting, Li Chao, Wang Jun* (194)

Recognition and application of pigs' position in group pens based on improved Faster R-CNN
.....*Wang Hao, Zeng Yaqiong, Pei Hongliang, Long Dingbiao, Xu Shunlai, Yang Feiyun, Liu Zuohua, Wang Dehui* (201)

Recognition method for prenatal behavior of ewes based on the acquisition nodes of the collar
..... *Ying Yewei, Zeng Songwei, Zhao Ayong, Yan Feifei* (210)

Measurement of dynamic fish dimension based on stereoscopic vision
..... *Li Yanjun, Huang Kangwei, Xiang Ji* (220)

• Agricultural Bioenvironmental and Energy Engineering •

Difference of the ratio of maize stovers to grain and spatiotemporal variation characteristics of maize stovers in China
..... *Huo Lili, Zhao Lixin, Yao Zonglu, Jia Jixiu, Zhao Yanan, Fu Guohao, Cong Hongbin* (227)

Methods for calculation of heating load in gutter-connected glasshouse
..... *Fu Jianlu, Zhou Changji, Wang Liu* (235)

Simulation and validation of extinction coefficient at different positions of cucumber and celery in solar greenhouse
.....*Cheng Chen, Li Zhenfa, Dong Chaoyang, Gong Zhihong, Feng Liping* (243)

Nitrogen use efficiency evaluation of “rice/pearl millet-mushroom-cabbage” recycling agriculture based on ¹⁵N tracer technique
.....*Zhong Zhenmei, Huang Qinlou, Chen Zhongdian, Huang Xiusheng, Feng Deqing* (253)

Technological design of slurry manure storage and returning to farmland for fertilization on large-scale dairy farm
..... *Xu Pengxiang, Shen Yujun, Ding Jingtao, Meng Haibo, Zhang Pengyue* (260)

Isolation and identification of cassava residue substrate fermentation microorganisms and compound bacteria preparation
.....*Wang Zhan, Leng Yuqian, Guo Shirong, Sun Jin, Xia Pengfei, Shu Sheng* (266)

• Land Security and Ecological Safety •

Farmland consolidation zoning based on coupling of improved limiting factors and farmland quality potential
.....*Zhao Haile, Xu Yan, Zhang Guoliang, Zhou Yi, Chang Yuyang* (272)

Land use optimization allocation based on improved NSGA-III by GPU parallel computing

..... *Wang Haijun, Zeng Haoran, Zhang Wenting, Zhang Bin, Zhou Linghui* (283)

• Agricultural Produce Processing Engineering •

Experiment on water pressure resistance of plastic-concrete waterproof system of underground granary

..... *Zhang Hao, Meng Qingting, Tao Yuanqing, Wang Zhenqing, Kang Shaopeng, Zhang Xiangxiang* (292)

Continuous fermentation process of fermented liquid feed

..... *Guan Xiaofeng, Liu Zhiyun, Xiao Rong, Liu Zuohua* (300)

Properties and synthesis mechanism of lignin-phenol-formaldehyde resin

..... *Wu Zhigang, Chen Sicheng, Liang Jiankun, Li Lifan, Lei Hong, Dong Jiying* (308)

• Reseach Letters •

Experimental study on the performance for heat pump hot air drying of Tibetan medicine at low-temperature

..... *Gao Meng, Li Ming, Wang Yunfeng, Yu Qiongfeng, Li Kun, Sun Wei, Luo Xi* (316)